

AUGUST 6, 1956

STEEL

The
Metalworking Weekly

A PENTON PUBLICATION



Core Hardening in Seconds

CO₂ promises a revolution in foundry practice . . . page 111

✓ Peace and Prosperity for Steel . . . page 77

✓ How Low Are Steel Stocks? . . . page 153

production ideas
NO. 3 OF A SERIES



CONTENTS — PAGE 5



here's why
LINE-ARC contactors
are industry's
first choice



No Destructive Arc Shield Burning

Arc is a fine centered between, but not touching, the arc shields.

Quick Removal of Hot-Arc From Contacts

As contacts separate, arc is transferred in 1/200th of a second from contacts to arcing-plate and circular guard over the blowout coil. Result is cool contacts . . . and cool contacts last longer.

No Lubrication-Maintenance

Self-lubricating bearings on main and auxiliary arms eliminate after overhaul lubrication-maintenance.

Magnetic Dust Problem is Licked

New Magnetic draft is unrestricted below the air gap.

Magnetic draft is free to fall, because there is no mechanical shield to catch dust, it does not pile up in air gap nor inside (requiring manual removal).

Safe Electrical Interlocking

Double-break coin silver contacts with normally-open circuit insulated from normally-closed circuit, so carry over from one to the other by an arc.

These Contactors are a tribute to sound engineering design. They have proved themselves in the severest crane and mill service. They respond quickly, due to the light-weight arm construction, handle the arc scientifically, and have long life. The high efficiency and lower upkeep of EC&M "LINE-ARC" Contactors are good reasons for specifying EC&M Magnetic Control for Cranes and auxiliary mill drives.

Write for Bulletin 1145-E.



SQUARE D COMPANY

EC & M DIVISION • CLEVELAND 28, OHIO

**Now the kitchen is as big
as all outdoors**



This is the season when America moves the dining-room outside—and takes the kitchen right along with it! Today practically anyone can enjoy an "out-door kitchen," thanks to ingenious, efficient, low-cost barbecue grills such as this one.

Like so many others, this model is all-steel, with the bowl, legs, handle and wheels being formed from cold-rolled sheet. Bethlehem supplies sheets to some leading manufacturers of barbecue grills and the tonnage, needless to say, is fairly zooming.

The same is true of many other products that have hit the "big time" just since World War II. Room air-conditioners, for example, and hay-balers, TV cabinets, steel ironing boards.

At the same time the demands of older users are increasing, too. Which should make it easier to understand why Bethlehem is being called upon to turn out hot- and cold-rolled sheets in larger volume than ever before. We are doing everything we can to catch up with this ever-mounting demand.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation, Export Distributor. Bethlehem Steel Export Corporation

BETHLEHEM SHEETS





"Bet a fish it's got **SKF** bearings!"

Don't take that bet, bird - unless you have fish to burn!

SKF is the company that sells *all four* basic types of bearings. And that means you'll find our bearings in more applications... in more places in the world... than any other bearings. In everything from roller skates to roaring jets, these bearings literally make the world go round. *Plus-quality SKF Bearings* are serving your industry, your family and you right now! 7728



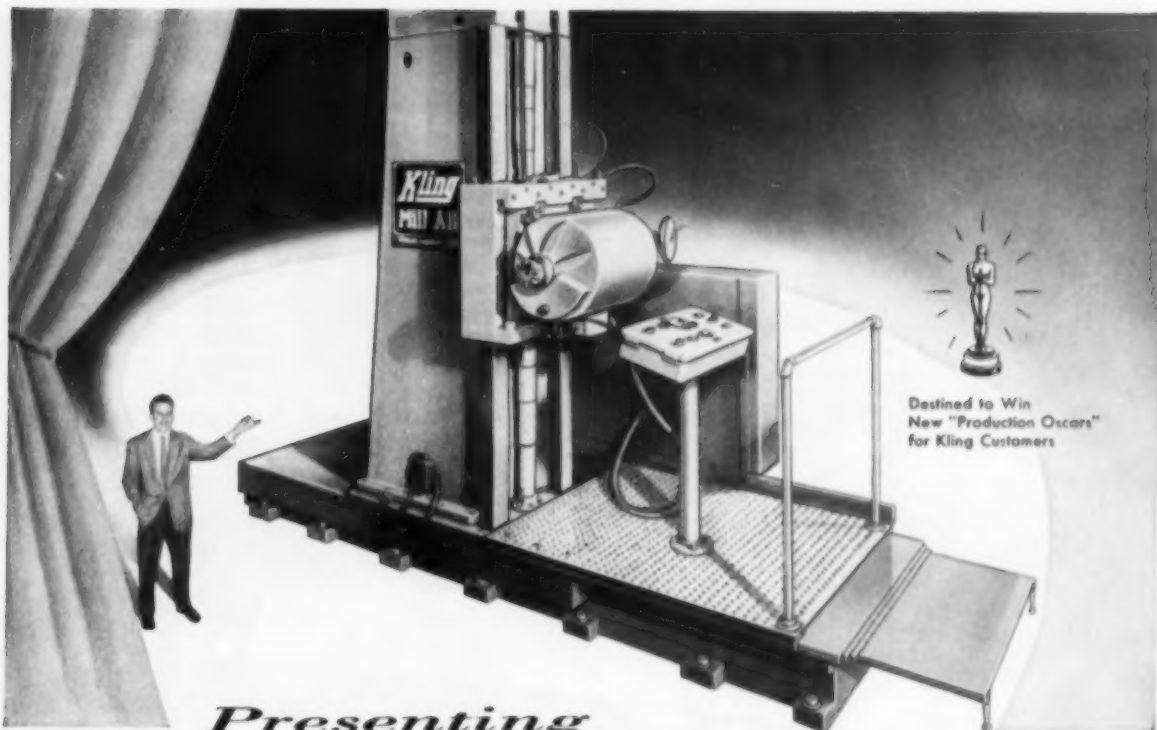
SKF-EVERY TYPE-EVERY USE

SKF

- Ball Bearings
- Cylindrical Roller Bearings
- Spherical Roller Bearings
- Tapered Roller Bearings ("Taper")

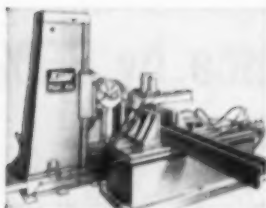
© Reg. U.S. Pat. Off. Tylen Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

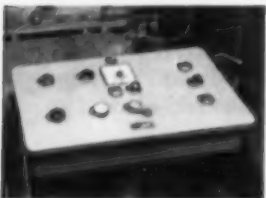


Presenting
 the New **Kling** MILL-ALL

...does more facing jobs faster and at lower cost!



Mill-All with Work Table and Hydraulic Holding Devices.



Operator Control Panel

This new high speed face milling machine has proven, in daily operation, every claim made for it for faster removal of metal from any structural shape, plate or fabrication. It offers exceptional power and capacity, is simply designed, easy to operate and enduringly built, as demonstrated by this partial list of construction details:

- ✓ Primary construction of machine is welded steel.
- ✓ Vertical feed screw is protected by telescoping tubular brass covers.
- ✓ Non-metallic ways are used on both the horizontal and vertical ways.
- ✓ Telescoping steel covers are used to protect the horizontal ways.
- ✓ Motor is mounted on a slide which provides for 10 inches of in-and-out travel of the cutter.

How this new machine Outperforms all others;
 Compare on these points with machines you are now using

Some of its jobs	Feed Rates	Metal Removal Rate	Horiz. Cutter Travel	Vert. Cutter Travel	Motors
Faces structural steel beams and columns and other steel sections and fabrications. Faces steel and iron castings, forgings, weldments, die blocks, etc. Does plate edging; can chamfer plates and bars (tilting head model) and can be adapted to mill aluminum and other nonferrous metals.	(Horiz. and Vert.) 40" and 80" per min.	Up to 80 cu. in. per min. 72" to 144"	4 sizes 72" to 144"	3 sizes 60" to 84"	3 H.P. Horiz. and Vert. Gear Head Feed Motors with Brake 40 H.P. Spindle Motor Direct Drive 75 H.P. also available

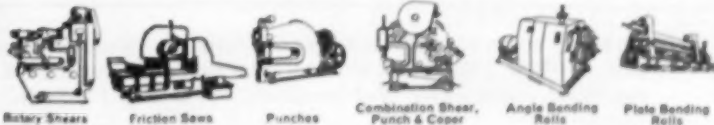
For further details call your nearest Kling Distributor. Active Kling Distributors cover practically every marketing area of U.S. and Canada. Write us for name of one nearest you.

Since 1892

Kling

KLING BROS. ENGINEERING WORKS
 1320 N. KOSTNER AVE. • CHICAGO 51, ILL.

Exclusive Canadian Distributor: Brown-Boggs Foundry & Machine Co. Ltd., Hamilton, Ont.
 Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd St., New York 17, New York





GOODYEAR INDUSTRIAL PRODUCTS



-Specified

Typical Uses for PLIOWELD

(corrosion-resistant rubber lining or covering)

- | | |
|--|--------------------------------|
| Tanks—rectangular, round, square, open top, flat or dished heads | Fume Hoods and Ducts |
| Tank Covers—flat, box, radius types | Scrubbers and Towers |
| Truck Tanks | Air Purifiers |
| Tank Barges | Agitators |
| Railroad Tank Cars | Troughs and Chutes |
| Fans—blades, wheels, housings | Continuous Vacuum Filters |
| Flanged Pipe and Fittings | Pumps |
| | Filter Frames |
| | Miscellaneous Fabricated Items |

PLIOWELD can also be used to combat abrasion

G.T.M. reduces pickling tank maintenance by 66%

ALMOST weekly repair of a lead-lined, wooden pickling tank was a major problem for this Midwestern steel processor. Maintenance cost alone ran into the thousands of dollars every year. Moreover, the lead often stuck to the steel strip, causing additional problems.

Finally it was decided to install a steel tank. The G.T.M.—Goodyear Technical Man—recommended a PLIOWELD rubber lining plus two courses of acid-resistant brick. He also helped

to develop a series of unique thermal expansion joints between the 40-foot tank sections. Result: *No shutdowns in two years, except for normal cleaning—maintenance slashed to one-third its former cost.*

Similar savings may be yours on any industrial rubber application by consulting the G.T.M. Contact him through your Goodyear Distributor, or write Goodyear, Industrial Products Division, Akron 16, Ohio.

PLIOWELD TANK LININGS by

GOOD YEAR

THE GREATEST NAME IN RUBBER

Ploweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

IT'S SMART TO DO BUSINESS with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."

In This Issue

STEEL
The
Metalworking Weekly

August 6, 1956

Vol. 139 No. 6

- ✓ 71 **Metalworking Outlook**—Higher Prices on the Way
- ✓ 75 **Editorial**—A Congress for Ike!
 - 77 The Steel Strike Settlement: What It Means
 - 79 Iron Ore Carriers Get Back on Job
 - 80 Manitoba: New Source for Nickel?
 - 81 Small Electric Motors Win Popularity Poll
 - 82 Metalworking's First Half Earnings Rise
 - 83 How First Half Steel Earnings Compare
- ✓ 84 **Windows of Washington**—Warehouse Freeze To Thaw
 - 87 Management at Work: Pipe Machinery's Briner
 - 88 Where To Look for Working Capital
- ✓ 91 **Mirrors of Motordom**—Station Wagons Beat Slump
- ✓ 95 **The Business Trend**—No Let-up Coming
 - 99 Men of Industry—News About Men You Know
 - 105 Westinghouse Expands Road Machinery Operations
- ✓ 109 **Technical Outlook**—Cylinders Stamped Out
 - 110 Test Guards Titanium Against Delayed Cracking
 - 111 CO₂ Hardens Molds and Cores in Seconds
 - 115 Nitriding Stainless in Liquid Salt
 - 116 English Gas Turbine Makes U. S. Debut
- ✓ 118 **Progress in Steelmaking**—New Galvanizing Line
 - 124 Plastic Pipe Finds Wider Use in Metalworking
 - 128 Foreign Machine Tools Show More Automation
 - 131 New Products and Equipment
 - 146 New Literature
- ✓ 151 **The Market Outlook**—Next Three Years in Steel Prices
 - 161 Price Indexes and Composites
 - 163 Steel Prices—Ores, p. 170; Ferroalloys, p. 171
 - 173 Scrap Market Trends—Prices, p. 174
 - 176 Nonferrous Metals
 - 178 Nonferrous Metal Prices
 - 180 Advertising Index

Behind the Scenes, p. 6; Letters, p. 10; Staff, p. 16; Meetings, p. 25; Index available semi-annually. STEEL also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

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August 6, 1956

UPSON-WALTON
DROP-FORGED
STEEL

**GOLD
CLIPS**

for wire rope



NEW U-W
GOLD CLIP

**ENGINEERED
FOR SAFETY**

• The new *Gold Clip* is your quick identification of top quality, gold-chromate coated after galvanizing for extra protection. All *Gold Clips* are drop-forged from high grade forging steel . . . designed for the toughest heavy duty service.

Specify *Gold Clip* . . . available from stock in 1/4" through 1 1/4" sizes, conveniently packaged in standard quantities. See your distributor for quick and efficient service. Write for literature on wire rope fittings.

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MANUFACTURERS OF
WIRE ROPE, TACKLE BLOCKS,
CRANE HOOK BLOCKS, ROPE FITTINGS
ESTABLISHED 1871



HERE'S HELP for your tooling problems

Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

JUST PUBLISHED 40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Panton Bldg., Cleveland 13, O., at the following prices:

1 to 10	\$2.00 ea.
11 to 50	1.90 ea.
51 to 100	1.80 ea.
101 to 200	1.70 ea.
over 200	1.60 ea.

behind the scenes



Foundrymen Excited

This week's cover invites attention to the CO₂ process, a deal that is setting the foundry people by the ears, and there's a picture for you: Did you ever see anybody set by the ears? Does anybody know precisely what it means? Oh, well, coming back to the CO₂ process, one of the foundrymen interviewed by Assistant Editor Byron Kennel declared that, in his opinion, within three years 80 per cent of all cores and molds would be made by this method. That was a strong statement, but, in the interest of accurate reporting, Byron faithfully recorded it, together with his other findings.

"It's a somewhat ticklish subject," mumbled Mr. Kennel, glancing about furtively. "Foundrymen have been making cores and molds by established methods for a long, long time, and the least you can expect is a loud argument when somebody comes along and says, in effect: 'Get with it, Mac! You're off the beam, and your feet are dragging, if you ain't hep to the CO₂ process!' I want everybody to know that I'm strictly neutral. I call 'em as I see 'em."

The way Byron sees it, a foundryman can use some sodium silicate (Boy, fetch that old, beat-up dictionary. Ah, here it is: Na₂SiO₃.)

As we were saying, a foundryman can use some Na₂SiO₃ to mix with his sand, blow some CO₂ gas through it, and come up with a core as hard as the pebble David slung (slang?) at Goliath. According to an old quotation, that stone was "jest a little ol' pebble, round as a goose egg, and hard as de Debbil."

The CO₂ process is already stirring up opposing camps; so if you don't know too much about the subject, turn to page 111 and bring yourself up to date on a really controversial subject.

Canada Calling

Although this effusion appears in August, it was prepared in the latter days of July, on a warm, humid day that was wrecked by the arrival of a parcel from Halifax, Nova Scotia.

Jack Prince, Dominion Steel & Coal Corp., Sydney, Nova Scotia, absent-ly listed himself one day as a reader of this page. Later, possibly in an attempt to distract our attention from his rash confession, he sent a package of travel literature from Halifax—and that was how the morning was wrecked.

Travel literature is always fascinating, but you really ought to get a load of this "Nova Scotia Camera Tour," published by the Department of Trade and Industry, Halifax.

It's a good sized book (9 x 12) filled solidly with breath-taking photographs in natural color. Little work could be done while these pictures beckoned slyly. While the heat rolled in the window, and Lake Erie lay steaming under the sun and our shirt clung like wet Kleenex, the pictures sang of cool salt water coveas, fresh winds blowing in from the ocean and spruce covered headlands marching under purple cloud shadows by the side of the sounding sea—and if you think that's corny prose, you're dead right. But that's what those pictures do to you: Before you know it, you're making like a mid-Victorian poet, because somehow or other, descriptive expressions such as "Boy, ain't them pitchers the nuts!" just don't seem to apply.

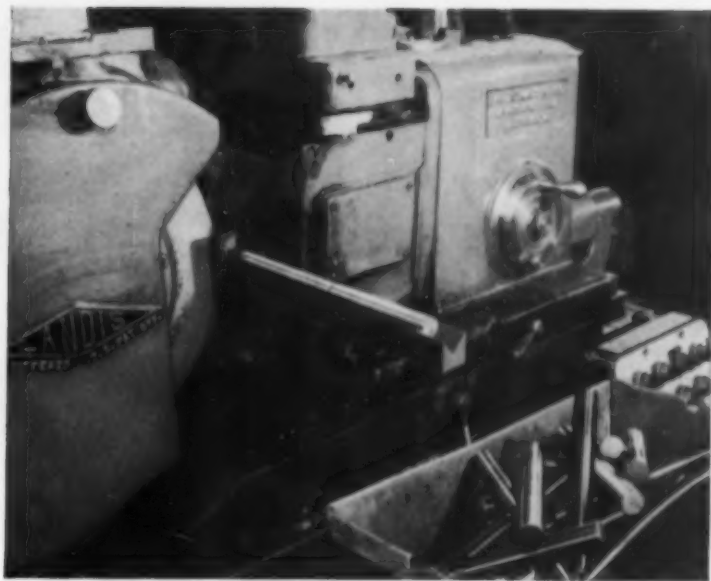
Now, the problem is how to convince the boss that we ought to be sent to Nova Scotia to make a personal investigation of current steel production and the seasonal lobster catch.

Cholmondeley Sulks

If you shuffle together two 52-card decks, and deal out 8 cards face up, there is a reasonable expectation that you may turn up an ace or a king. Beowulf J. Cholmondeley, however, wouldn't play unless he figured a closer approximation of the odds, but, having lost his abacus, he's stuck. Anybody care to help him?

Shradu

(Metalworking Outlook—Page 71)



Threads 7 $\frac{1}{4}$ " per Minute by CONTINUOUS GRINDING

LANDIS Centerless Thread Grinders are being used at the Kilbourn Engineering Company in Milwaukee, Wisconsin, to produce continuous threaded studs for high-pressure high-temperature service.

Studs ranging from $\frac{5}{8}$ " to $1\frac{3}{8}$ " in diameter are threaded from blanks of SAE 4140 steel heat-treated to a 260-320 Brinell hardness. In the operations illustrated, $1\frac{1}{8}$ " 8 pitch UN threads must be generated 10" long to a Class 7 fit to meet ASA standards (Manual B1.4). These threads are produced with LANDIS #1 Centerless Thread Grinders by continuous thru-feed grinding at the rate of 7 $\frac{1}{4}$ linear inches per minute, or better. The excellent

quality and smooth finish of the ground thread has reduced final assembly time and minimized galling.

Centerless Thread Grinders, manufactured exclusively by LANDIS, are designed for the high-speed threading of a wide variety of workpieces from $\frac{1}{4}$ " to 4 $\frac{3}{4}$ " in diameter. Blanks having one or more diameters, requiring threads on the outer diameter, can be threaded automatically by the thru-feed process used here.

Centerless Thread Grinding, by utilizing the "up-grinding" technique, is also well-adapted for threading workpieces of high hardness and coarse pitch. This process allows up to 30% higher work surface speeds, and often eliminates secondary threading passes required by other methods.

For further information, send specifications and ask for Bulletin E-97.



LANDIS Machine COMPANY
WAYNESBORO • PENNSYLVANIA • U.S.A.

do you want low-cost corrosion or contamination

Acetone • Borax • Calcium Carbide • Calcium Carbonate • Calcium Chloride (Flake) •
Ethyl Acetate • Ethyl Alcohol • Ethylene Glycol • Glycerine • Insecticide Concentrates •
Soap and Soap Lye • Soda Ash • Sodium Bicarbonate • Sodium Silicate •



LECTRO-CLAD^{*}

Trademark

Nickel Plated Steel Plates will give it to you

Yes, you can get low-cost, yet effective protection against contamination and corrosion with all these chemicals...and many more!

Effective in heavy industrial applications where the corrosion rate does not exceed 0.0015 inches per year, CF&I LECTRO-CLAD Nickel Plated Steel Plates successfully combine the corrosion and contamination resistance of nickel and the economy and strength of carbon steel.

That's because CF&I LECTRO-CLAD is made by the Bart Process, which consists of electrodepositing a heavy layer of 99% pure nickel on a carbon steel plate. This process results in a permanent bond between the nickel and the steel base. The nickel plating

is customarily supplied in the 8-10 mil range; however, it can be plated up to 15-20 mils, if specified.

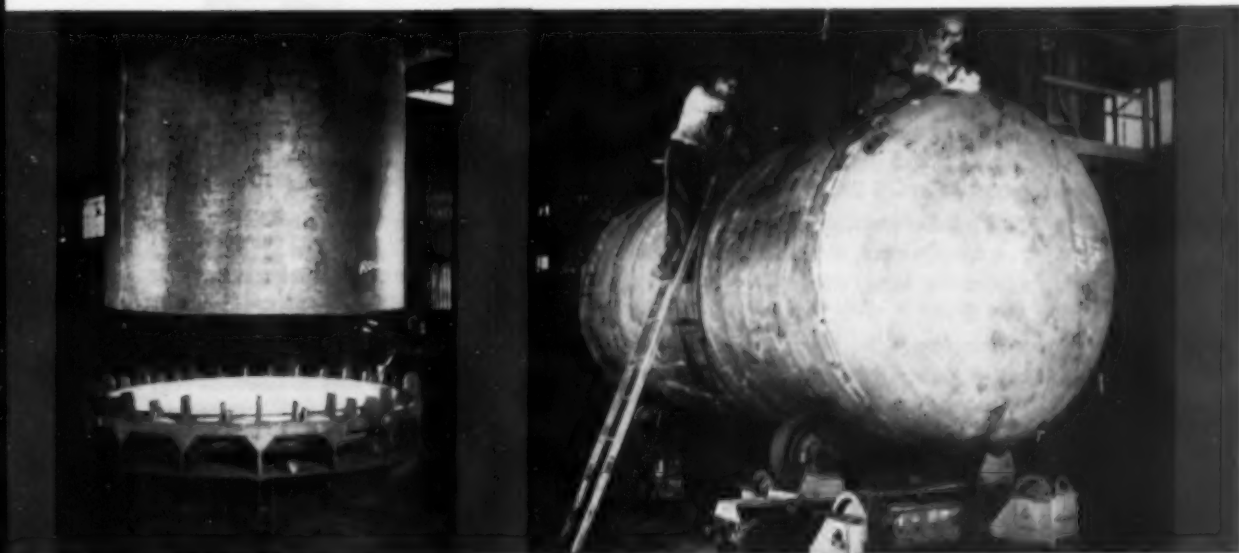
What's more, CF&I LECTRO-CLAD Nickel Plated Steel Plates are easily fabricated without costly special equipment. Just use regular shop equipment and bend it...weld it...roll it—the protective nickel layer will not check, spall or flake!

Ask our nearest sales office for the complete story on economical, effective, easy-to-fabricate CF&I LECTRO-CLAD Nickel Plated Steel Plate today. Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

***NICKEL PLATED BY THE BART LECTRO-CLAD PROCESS**

protection against with these chemicals?

Caustic Soda • Chlorinated Hydrocarbons • Cold Hydrofluoric Acid • Dibutyl Phthalate
Methyl Alcohol • Petroleum Catalysts • Phenol • Potash • Resin Plasticizers • Salt
Sodium Sulphate • Titanium Dioxide • Tricresyl Phosphate



Assembling a tank fabricated from CF&I LECTRO-CLAD Nickel Plated Steel Plates.

3798

Claymont Steel Products

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

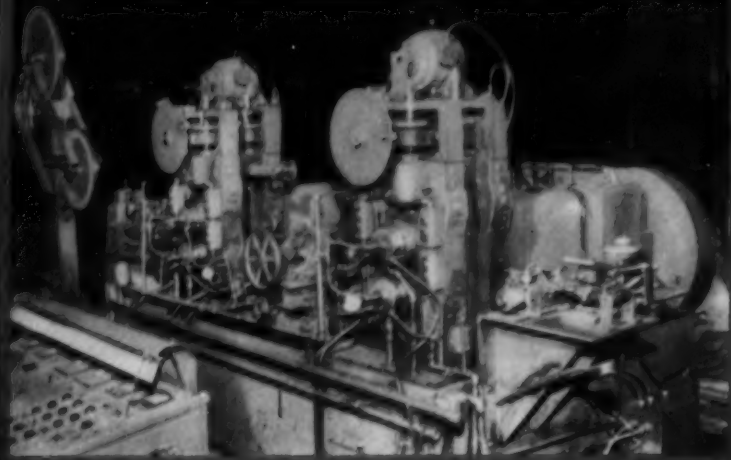


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OTHER CLAYMONT PRODUCTS

Stainless-Clad Plates • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe • Fabricated Steel Parts • Flanged and Dished Heads • Alloy Steel Plates • High Strength Low Alloy Steel Plates

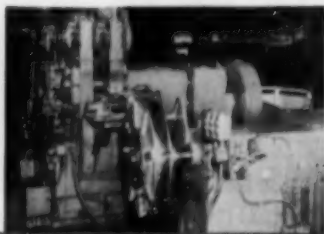
ROLLING WIRE AT 1200 FPM



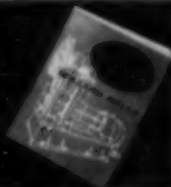
THIS Fenn Model 082 Tandem Rolling Mill is in operation at the Continental Steel Corporation, Kokomo, Indiana, and is an excellent example of modern, high speed, precision wire flattening. With this mill, Continental reports production speeds of 400 FPM to 1200 FPM. Wire sizes run ranged from 0.5 in. x .130 in. at 1600 lbs., per hour down to .197 in. x .024 in. at 600 lbs., per hour.

In addition to its precision operation and compactness the Model 082 mill features a one piece bed, automatic loop regulator, power screw-downs, friction-driven edger, electronic gaging, and hydraulically traversing take-up reel.

Whatever your requirements for rolling ferrous and nonferrous metals in sheets, strips, wire or rod, it will pay you to investigate the Fenn line of Precision Rolling Mills. Fenn engineering service is available at all times to help you solve any rolling problem.



SEND FOR NEW
FENN ROLLING
MILL CATALOG



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THE FENN MANUFACTURING COMPANY, 403 FENN ROAD, NEWINGTON, CONNECTICUT

LETTERS TO THE EDITORS

Lauds Brainstorming Story

Within several months, we plan to have a meeting on group ideation (brainstorming). It will probably be attended by 350 persons.

We have reviewed articles on this subject and have decided that yours, "Ideas for Industry" (Apr. 23, page 105), is so outstanding that we would like to give copies to those attending the meeting.

Please send 350 reprints.

James H. McCormick
Special Sales Activities
Advertising Department
E. I. du Pont de Nemours & Co.
Wilmington, Del.

Could Be Used as Textbook



If you can spare them, I would like two copies of the sixth article in your 1956 Program for Management, "How To Live with SUB" (July 16, page 121).

You folks do an excellent editorial job. In many ways, your magazine could be used as a textbook.

W. J. Webb
Vice President and Division Manager
Division of Outboard Marine & Mfg. Co.
Evinrude Motors
Milwaukee

Please send an additional copy of this article.

C. W. Smith
Vice President
Rodney Metals Inc.
New Bedford, Mass.

Production Speed-Up Planned

We read with interest the article, "Fabricator Expands" (July 2, page 61).

Since we are making plans to speed up production in our metal fabrication section, we would like to know more about the acetylene-oxygen unit (described in the story) which cuts heavy steel beams.

Any information would be appreciated.

W. R. Kern
Design Engineer
Pusey & Jones Corp.
Wilmington, Del.

• This machine was designed by Luria Engineering Co. We suggest you write the firm's Bethlehem, Pa., plant where a similar machine is already in operation.

Steel Wire Shape Sought

We are attaching a copy of a letter sent to some dozen steel companies in trying to locate a shape of stainless steel wire. The material is a D-shaped wire (about 1/8 x 3/16-in.) with the flat

(Please turn to page 12)

HOT or COLD



these chutes WORK...

THANKS TO a special STAINLESS STEEL!



Courtesy: Switlik Parachute Co., Inc.
John Evans' Sons, Inc.

In the sweltering tropics or sub-zero north, these new Navy parachutes give fool-proof service . . . thanks to the properties of a newly developed stainless steel.

Lighter and far more compact than conventional models—these chutes depend on springs channeled in the fabric—to exert tension when the chute is packed, then provide split-second opening when the rip cord is pulled. Initial designs called for springs of carbon steel until problems of corrosion, and embrittlement from sub-zero temperatures revealed the need for a more suitable steel.

Frassé engineers, invited to collaborate, recommended 17-7 PH—a precipitation hardening stainless steel grade that provided the required resistance to corrosion and embrittlement . . . made possible a single low temperature heat treatment with practically no distortion. Net result—a problem solved, a more durable, safer product, and 20% reduction in fabricating cost.

New steels and new uses for established grades are the continuing study of Frassé engineers. Consult them on your next steel problem—chances are they can recommend a steel to save money, increase production or improve your product. There's no obligation. Just call or write your nearest Frassé office.


Call **FRASSE 1st**

for **STAINLESS STEEL**

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Wire

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Want to know more about

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This new Frassé brochure contains data on 18 different types and points up the benefits of each. Fabricating data and application hints are included. Simply fill in the coupon below for your copy today.



Peter A. Frassé & Co., Inc.
(use address nearest you)

Please send me your new brochure containing data on stainless steel.

Name _____ Title _____

Firm _____

Address _____



Handling Costs Are Lower When the Crane is a Bucyrus-Erie

On material handling jobs, the speed of Bucyrus-Erie crawler-mounted cranes brings you savings all down the line. Here's how:

Independent boom hoist permits quick boom-angle changes. Direct-connected "full feel" controls respond instantly to help the operator "inch" loads up or down . . . quickly.

Low center of gravity and long, wide-spread crawler units assure maximum stability and firm footing . . . enable operator to work rapidly and to handle long booms with ease.

For extra speed and convenience, jib extensions can be connected without removing sheaves, guards, suspension ropes, or any of the boom-point machinery.

This is just a sample of the advantages Bucyrus-Erie cranes offer. See your nearby Bucyrus-Erie distributor soon, and find

out how these machines can cut YOUR handling costs.

249C56

Bonus Quality For chemical analysis of steel and other materials, Bucyrus-Erie's laboratory has the finest scientific equipment, including the spectrophotometer shown here. This apparatus analyzes the elements in steel by measuring the degree to which a steel solution absorbs certain waves of light. Both the presence of elements and their exact quantities can be determined by this extremely sensitive instrument.



**BUCYRUS
ERIE**

SOUTH MILWAUKEE, WISCONSIN

LETTERS

(Concluded from page 10)

side of the "D" serrated.

This shape looks identical to standard shape No. 5 described in the article, "Save with Shaped Wire (July 16, page 132).

We are anxious to locate a source of this wire and would appreciate any assistance you may offer us.

Robert H. Inglesby
Sales Manager
Port City Steel Co.
Savannah, Ga.

• Write: American Steel & Wire Division, U. S. Steel Corp., Stainless Steel Sales, Rockefeller Bldg., Cleveland 13, O., or Alloy Steel Wire Division, H. K. Porter Company Inc., Prospect Park, Pa.

STEEL's Price Data Promoted

For the past year, we have been selling our customers on using your publication for up-to-date warehouse prices for both the New York and Buffalo metropolitan areas.

We understand that on July 13 some New York and Buffalo jobbers increased their base prices across the board 50 cents per hundredweight on hot-rolled items and 25 cents per hundredweight on cold-finished sheets.

We would appreciate your informing us when your publication will show these changes.

C. F. Straney
Secretary
Albany Steel & Iron Supply Co. Inc.
Albany, N. Y.

• The increases are reported on pages 109, 121 and 136 of the July 23 issue. They came after the July 16 issue went to press.

Picture Draws Inquiry

You show a picture of lubricant roll coating equipment in the article, "Lubrication in Drawing" Part II (July 16, page 148). We would appreciate knowing from whom this equipment might be purchased.

R. W. Brewer
District Purchasing Agent
Closure Division
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Analyzing the Lime Market

We are attempting to evaluate the market for lime and limestone in the iron and steel industry in four states, Pennsylvania, Maryland, Virginia and West Virginia. We would be pleased to receive such information as would be helpful to us in this effort. We are interested in the broader aspects of limestone and lime and its relation qualitatively, quantitatively and economically to the tremendous iron and steel industry.

George A. Zeigler
General Sales Manager
M. J. Grove Lime Co.
Lime Kiln, Md.

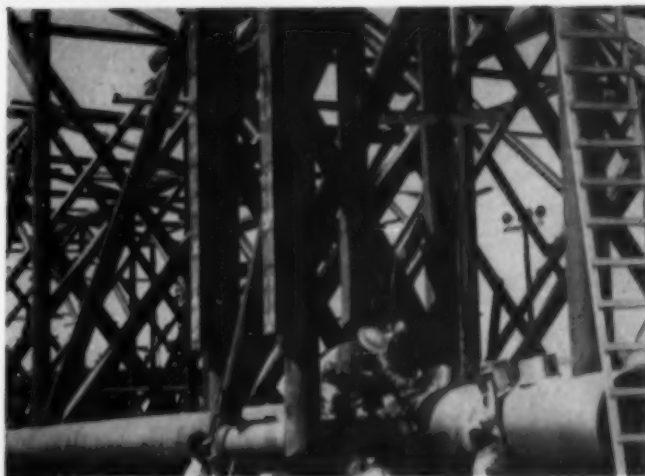
• You might find it helpful to obtain a copy of the booklet, Annual Capacities of Coke Ovens, Blast Furnaces and Steelmaking Furnaces as of Jan. 1, 1956, by Companies, States and Districts, which may be obtained by writing to the American Iron & Steel Institute, 150 E. 42nd St., New York 17, N. Y.

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Aug. 13

IN

STEEL

To Merge or Not to Merge

That's the question for hundreds of metalworking companies, as a postwar record of 1050 industrial marriages is expected this year. The seventh article in STEEL's Program for Management in 1956 will present a study of the pros and cons of merging. Particular attention will be devoted to areas of management, personnel, marketing and taxation that are especially important for every company considering joining with another. Merger may be a quick path to revitalization or a slow road to oblivion. STEEL's article can help you choose the right way to new growth.

STEEL

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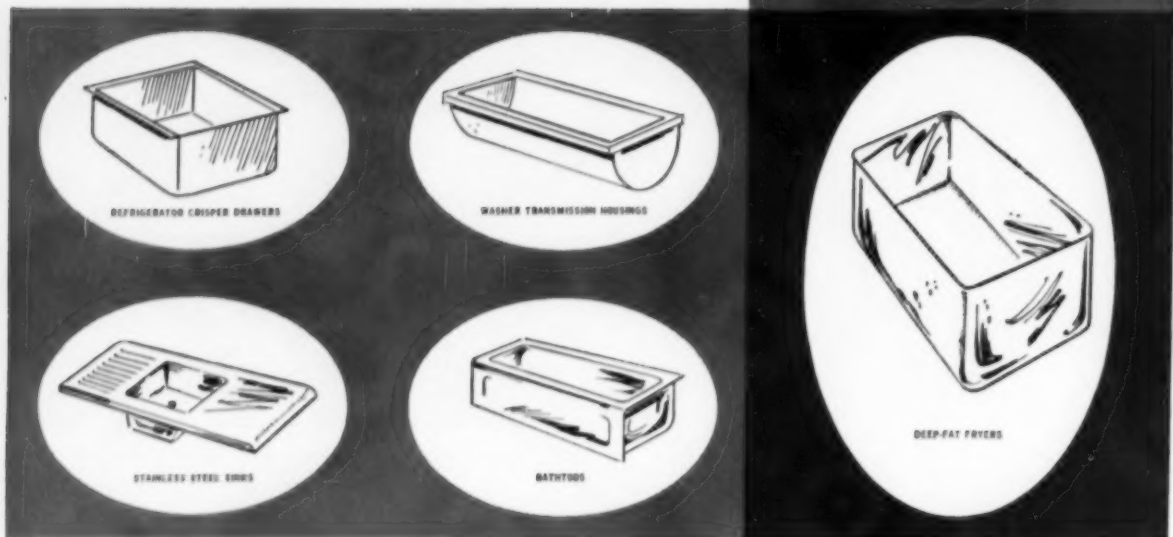
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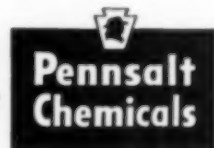


You can keep deep-drawing dies in top working condition, and cut rejects to a startling degree—simply by using steel bar and sheet stock *pre-coated* with Pennsalt DRAWCOTE. A dry, homogeneous lubricating film applied either alone or in conjunction with other Pennsalt FOS Process chemicals, Drawcote gives even severely-drawn pieces a welcome freedom from scratches and galls . . . protects dies longer than old-fashioned wet lubricants . . . cleans off easily *at any time* before finishing.

There's a Pennsalt FOS lubrication system tailored to improve *your* toughest deep-draw operation—on parts ranging from thin sections to heavy housings . . . aluminum to stainless steel. Whether your job calls for Pennsalt FOSCOAT[®], FOSLUBE[®], DRAWCOTE[®], or any combination of these FOS lubricants, they're applied before the metal comes to the drawing presses—in fact, often by the supplier of metal stock. Parts generally need no recoating between press stages. Call your Pennsalt man for the whole story, or write Metal Processing Dept. 312, Pennsylvania Salt Manufacturing Co. East: Three Penn Center Plaza, Phila. 2, Pa.; West: 2020 Milvia St., Berkeley 4, Calif. In Canada: Pennsalt Chemicals of Canada, Hamilton, Ontario.

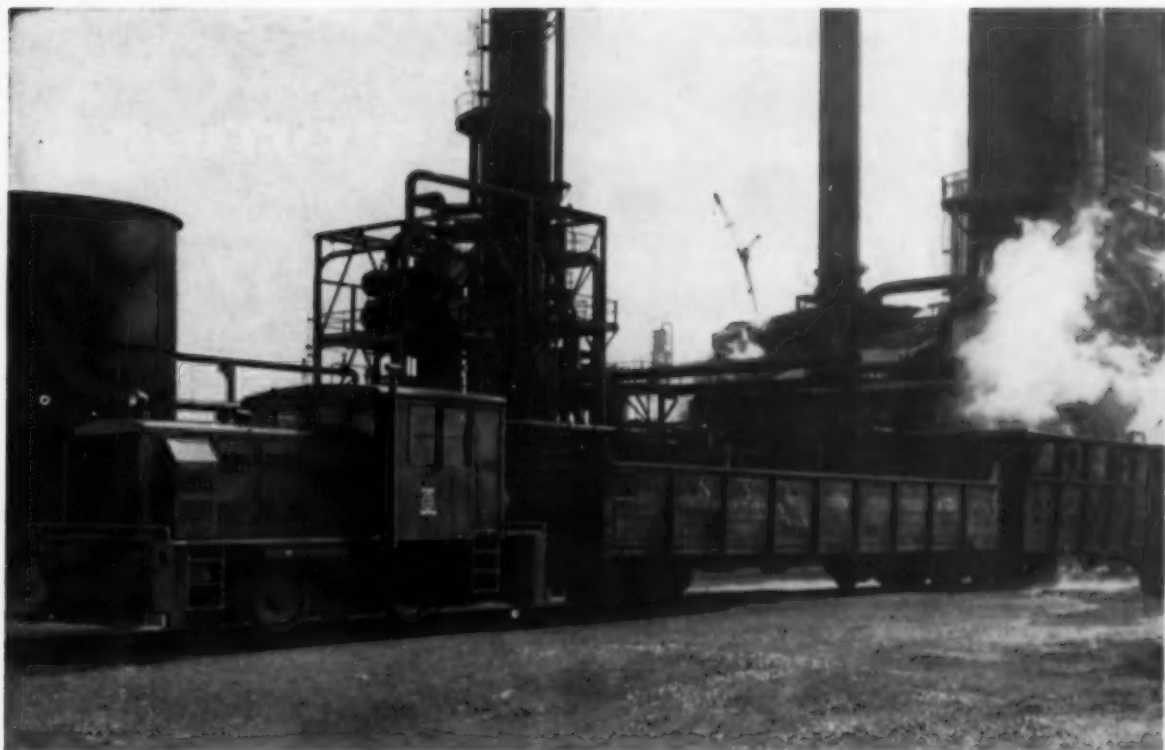
FOR EXAMPLE:

One manufacturer of deep-fat fryers and other severely-drawn appliance shells tried all the old drawing compounds he could lay his hands on—soaps, oils, waxes—but the shells still came out scratched and needed costly buffing before going to the plating line. Since trying one of the Pennsalt FOS cycles designed for his lubrication problem, he's discarded the wet, messy, unpredictable drawing compounds of the past . . . started turning out scratch-free parts . . . has lowered costs in dies, raw materials, finishing . . . made his shop a cleaner, happier place to work in.



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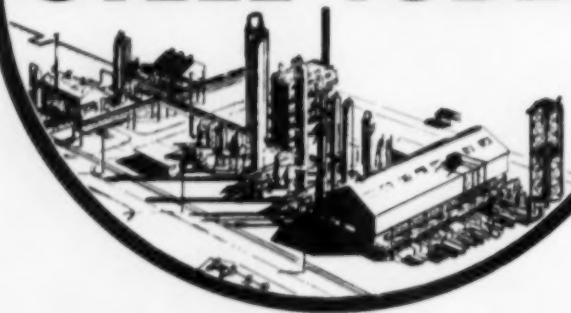
The hydrocarbon reformer furnace tubes shown here were furnished to The Girdler Company, of Louisville, Kentucky, leading designers of gas processing plants and equipment.



Picture of
Teamwork ...

ACIPCO

Centrifugally Spun STEEL TUBES



SIZE RANGE: Lengths up to 16'—longer lengths by welding tubes together. OD's from 2.25" to 50"; wall thicknesses from .25" to 4"

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steels; plain carbon grades and special non-standard analyses.

FURNISHED: As cast, rough machined, or finish machined, including honing.



Outstanding teamwork between the staff at Acipco and its customers has solved many difficult design and fabrication problems. Shown here, studying the results of this teamwork, are a customer's project engineer, an Acipco engineer and an Acipco inspector. They are part of the supplier-buyer team that produced a new hydrocarbon reformer furnace tube, designed and fabricated to operate at 1700 degrees Fahrenheit and over 100 psi. Over 400 of these tubes, completely fabricated and tested at Acipco, will soon be serving the petroleum refining industry.

Among the specifications for these tubes are:

Tube Analysis: Austenitic stainless steel, centrifugally spun.

100% radiography of all welds.

Hydrostatic testing at 1100 psi.

Air testing at 100 psi.

Call on Acipco's combination of teamwork, manufacturing know-how, and integrated facilities for spinning, heat treating, machining, fabricating and testing, to produce the exact steel tubes you require. You'll get quality plus a saving.

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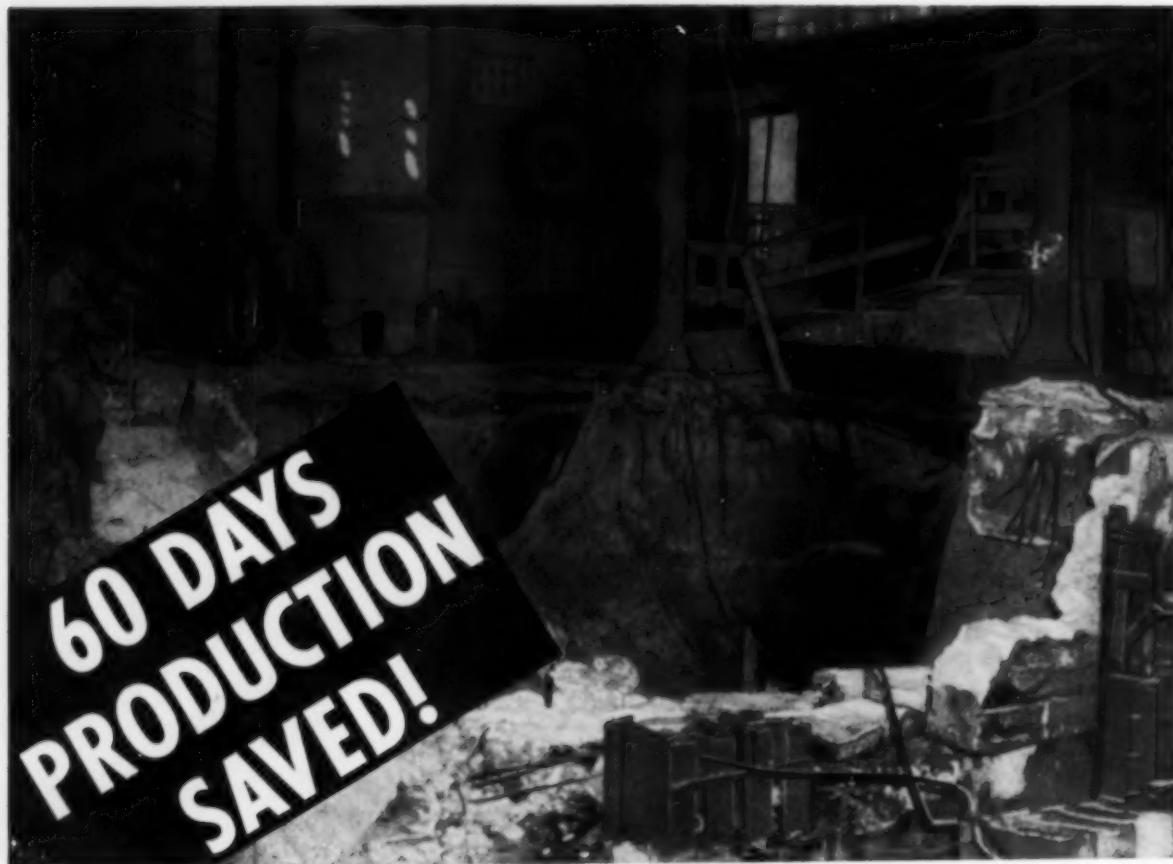
With Behr-Manning Abrasive Belts on hand, the job is both easy and highly productive. Foundries all over the country are finding these fast-cutting, long-lasting belts the answer to increased output with far better finishes.

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"... and this was accomplished without disrupting other work going on in area... and, more important, without an accident!"

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- Aug. 6-8, Society of Automotive Engineers Inc.:** National west coast meeting, Mark Hopkins hotel, San Francisco. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.
- Aug. 7-8, National Screw Machine Products Association:** National sales conference, Wade Park Manor hotel, Cleveland. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Wernitz.
- Aug. 21-24, Western Electronic Show and Convention:** Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Information: Wescon, 344 N. LaBrea Ave., Los Angeles 36, Calif.
- Sept. 7-9, Metal Powder Association:** Fall meeting, Homestead, Hot Springs, Va. Association's address: 429 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.
- Sept. 9-12, American Institute of Chemical Engineers:** Fall meeting, William Penn hotel, Pittsburgh. Institute's address: 129 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.
- Sept. 9-12, National Metal Trades Association:** Eastern plant management conference, Essex-Sussex hotel, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.
- Sept. 10-12, Allied Railway Supply Association:** Annual meeting, Sherman hotel, Chicago. Association's address: 1200 W. Chase Ave., Chicago 26, Ill. Executive secretary: Charles F. Weil.
- Sept. 10-12, Packaging Institute:** Annual forum, Hotel Statler, Cleveland. Institute's address: 343 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.
- Sept. 10-12, Society of Automotive Engineers Inc.:** National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.
- Sept. 11-13, American Die Casting Institute:** Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 346 Madison Ave., New York 17, N. Y. Secretary: David Laine.
- Sept. 11-14, Packaging Machinery Manufacturers Institute:** Packaging machinery and materials exposition, Public Auditorium, Cleveland. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.
- Sept. 13-14, Porcelain Enamel Institute:** Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Institute's address: 1145 19th St. N. W., Washington 6, D. C. Secretary: John C. Oliver.
- Sept. 16-20, American Society of Sanitary Engineering:** Annual meeting, Morrison hotel, Chicago. Society's address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.
- Sept. 16-21, American Chemical Society:** Annual meeting, Convention Hall, Atlantic City, N. J. Society's address: 1165 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.
- Sept. 17-21, American Society for Testing Materials:** Pacific area national meeting and apparatus exhibit, Hotel Statler, Los Angeles. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.
- Sept. 17-21, Instrument Society of America:** Annual instrument-automation conference and exhibit, Coliseum, New York. Society's address: 1319 Allegheny Ave., Pittsburgh 23, Pa. Executive director: William H. Kushniek.
- Sept. 20-21, American Hot Dip Galvanizers Association:** Semiannual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1906 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swenson.

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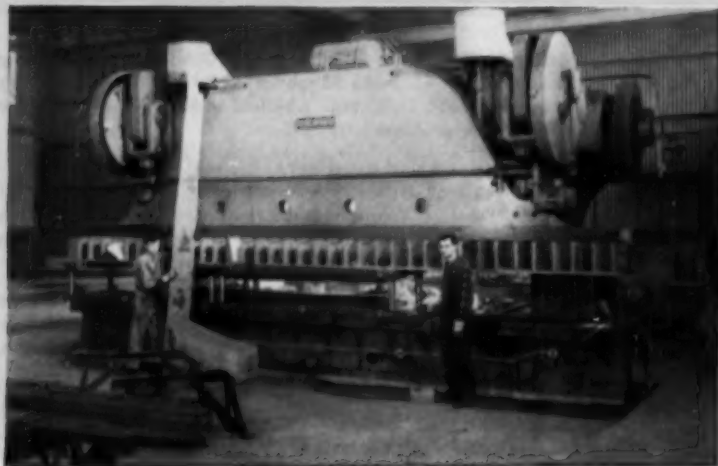
70 minutes cut

on combined blanking and punching operations!

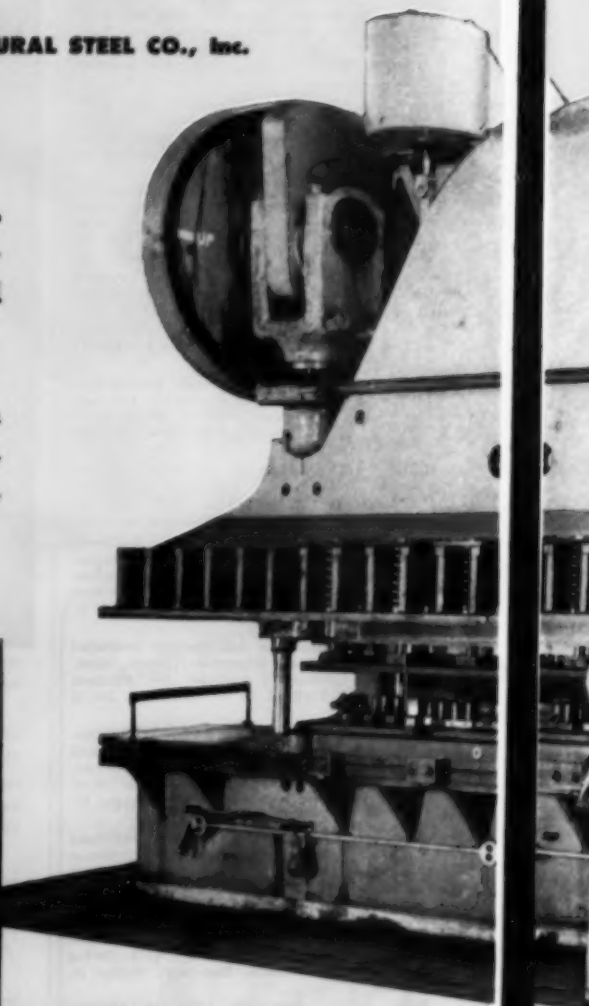
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Fort Wayne, Ind.

This versatile Cincinnati All-Steel Press Brake, 34 Series x 16', has revolutionized the production of these long motor truck side rail reinforcements.

Check with our die engineering department on the application of a versatile Cincinnati All-Steel Press Brake in your shop. It can sharply reduce your production costs.



(A) Blanking floor to floor time $1\frac{1}{4}$ minutes.
Previous time 34 minutes.



(B) Note Fort Wayne's ingenious punching equipment which reduced punching time from 36 minutes to $1\frac{1}{2}$ minutes and took advantage of every versatile Cincinnati feature.

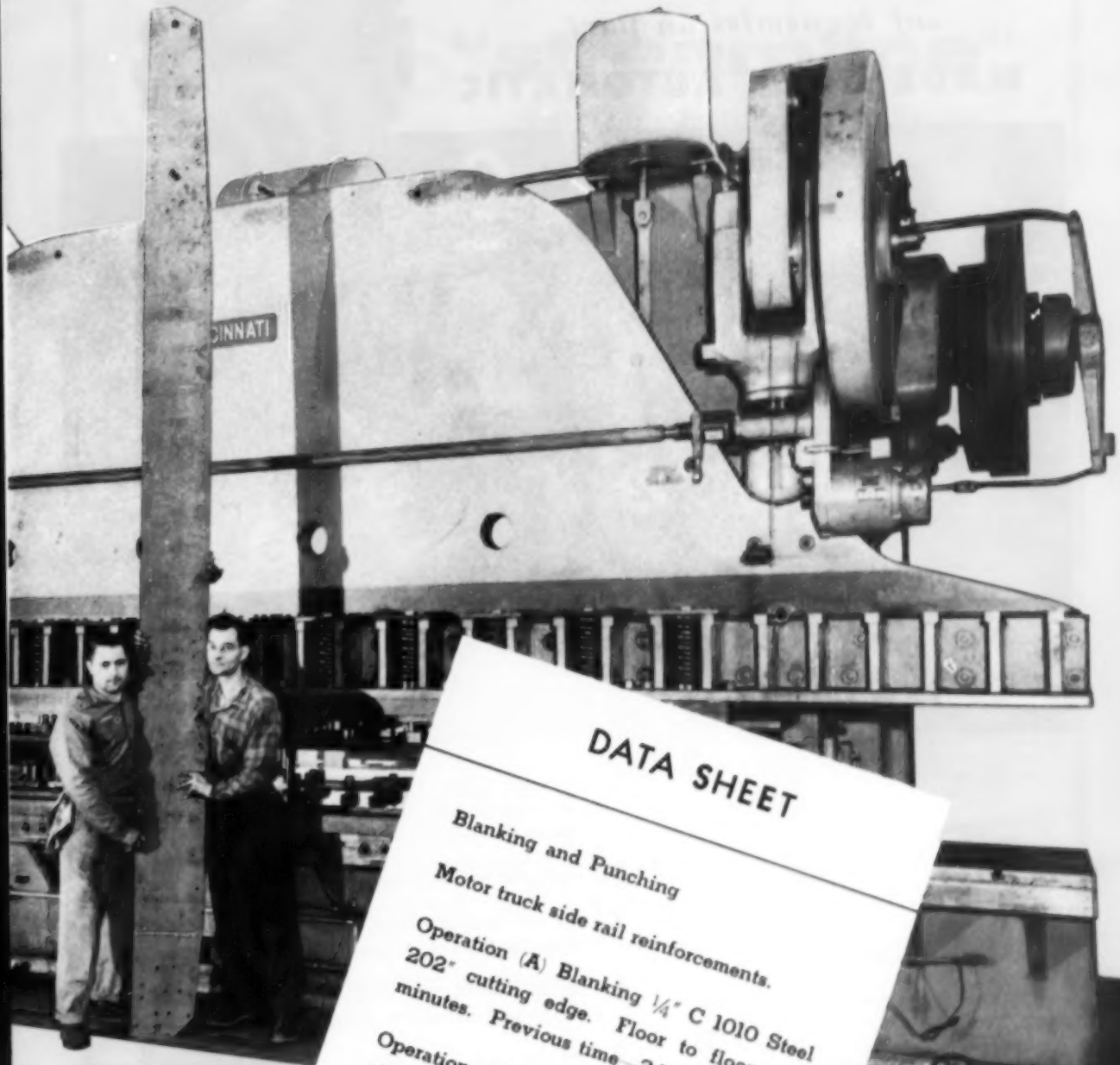


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DATA SHEET

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Motor truck side rail reinforcements.

Operation (A) Blanking $\frac{1}{4}$ " C 1010 Steel
202" cutting edge. Floor to floor— $1\frac{1}{4}$
minutes. Previous time—34 minutes.

Operation (B) Punching 130 holes per
stroke. Floor to floor— $1\frac{1}{2}$ minutes. Previ-
ous time—36 minutes.

John L. Hayner
President

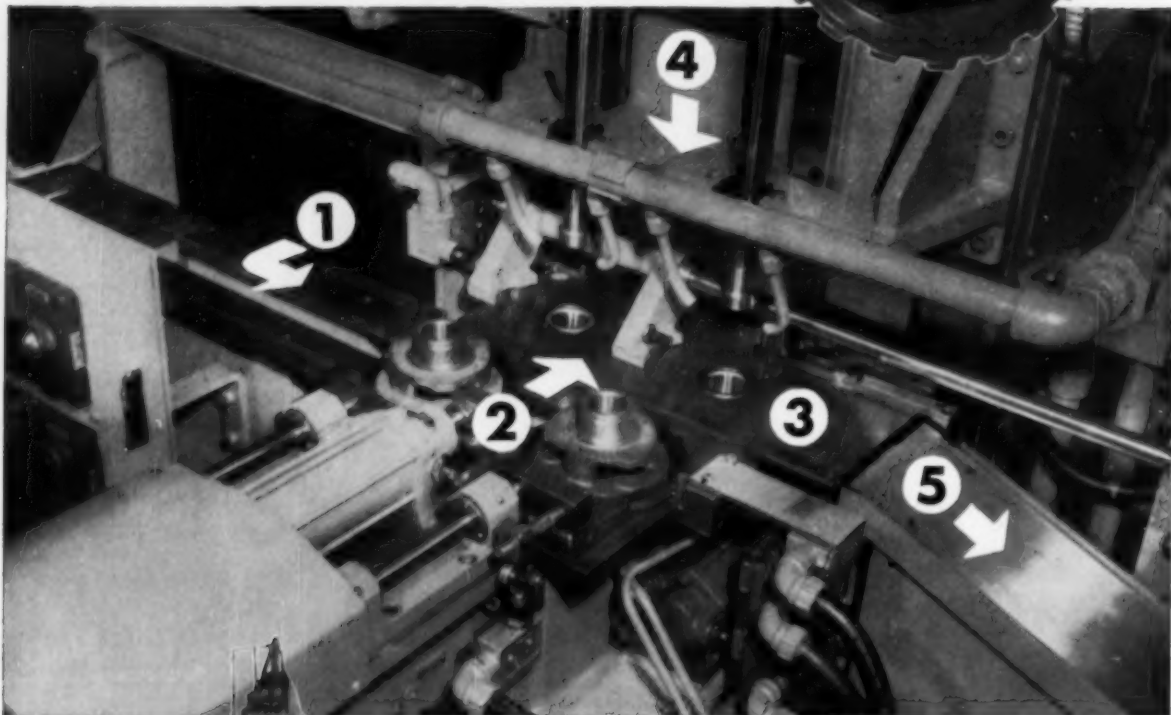
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- 2** Hydraulic pusher carries parts into broaching position.
- 3** An automatic skid plate then lowers and seats the parts over the thrust bushings.
- 4** Spline broaches, 36" long, are pulled down through the two parts, broaching 35 splines in the ID of the hub.
- 5** As skid plate rises, unseating the parts, hydraulic plunger ejects the parts down inclined chute.

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A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

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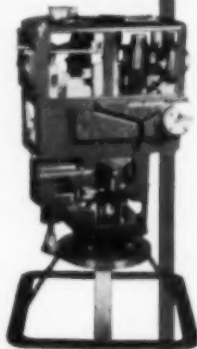
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5

practical ways to "streamline"

...without sacrificing fastening strength



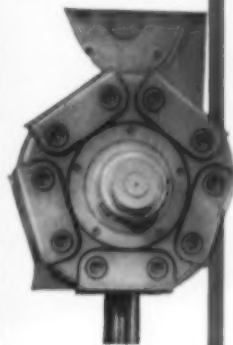
1. Counterbored holes are the simplest approach to flush surfaces using standard socket cap screws. The advantage of specifying genuine Allen \odot Head Cap Screws is the greater strength of Allenoy steel... you can use smaller sizes for closer spacing and reduced weight. Call on Allen, too, for *very large* socket-head, precision cap screws — up to 2½ inch diameter.



2. Countersinking enables you to get absolutely smooth external surfaces using Allen \odot Flat Head Cap Screws. Allen \odot Cap Screws feature the exclusive Leader Point which makes screw starting easier and guards against thread damage.



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5. Bright finish, or rust and corrosion resistance call for Allen \odot Stainless Steel Cap Screws. They are standard stocked items (both NF & NC threads) readily available in a wide range of sizes from Allen Distributors.

YOUR ALLEN DISTRIBUTOR can give you practical help and swift service. For complete information on any technical fastening problem, write our engineering department direct.

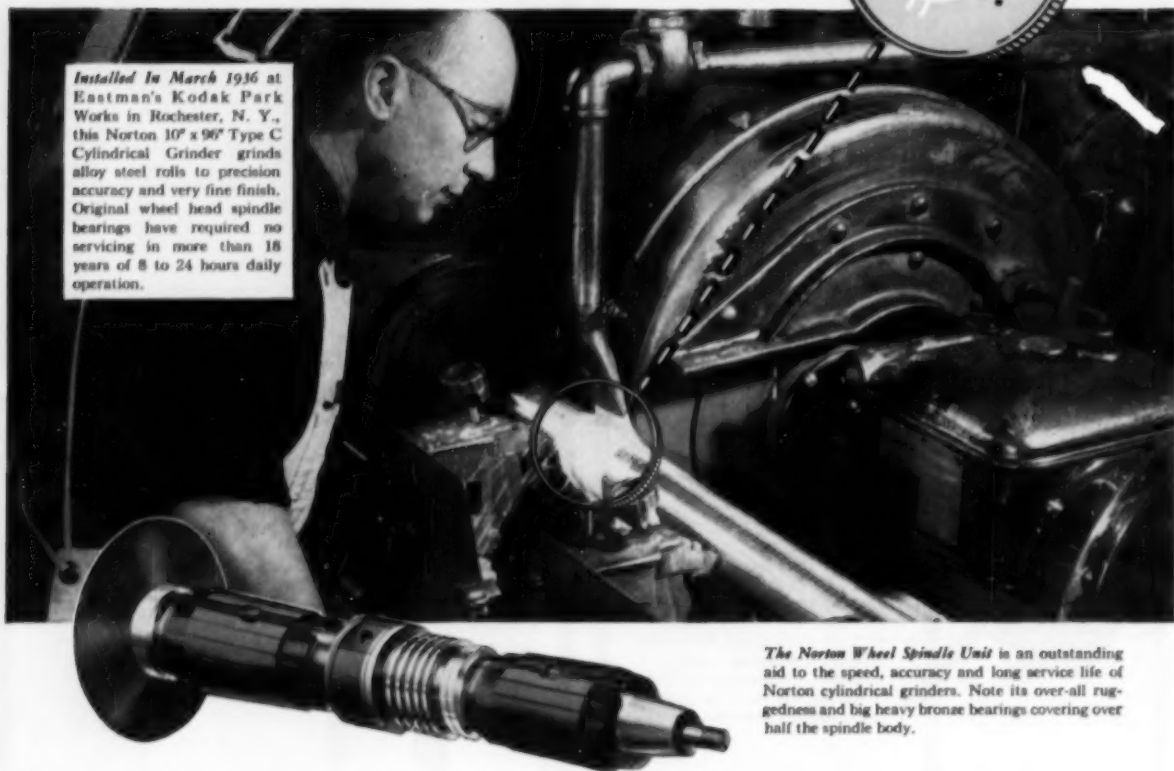


How Eastman Kodak gets Extreme accuracy...fine finish... years of trouble-free grinding

*Norton wheel spindle a key factor in
grinding performance that means...*



Installed in March 1936 at Eastman's Kodak Park Works in Rochester, N. Y., this Norton 10" x 96" Type C Cylindrical Grinder grinds alloy steel rolls to precision accuracy and very fine finish. Original wheel head spindle bearings have required no servicing in more than 18 years of 8 to 24 hours daily operation.



The Norton Wheel Spindle Unit is an outstanding aid to the speed, accuracy and long service life of Norton cylindrical grinders. Note its over-all ruggedness and big heavy bronze bearings covering over half the spindle body.

Why are Norton cylindrical grinders so fast and accurate over such a wide range of precision finishing and heavy stock removal jobs?

Why do these hard-working machines last so long, cost so little to maintain?

Advanced features like the Norton wheel spindle unit are the answer. Advantages of this typical Norton development for better, lower cost grinding include:

- *Over 50% of spindle body enclosed in two large heavy-duty, hard bronze bearings for extra long life.*
- *Rugged proportions, and metals toughened by special heat treating, are further aids to long service.*
- *Rigid support over practically the entire spindle surface affords maximum resistance to wheel pressures.*
- *Bearing length of more than twice the diameter increases bearing life.*
- *Automatic flood lubrication of bearings, with flow continually visible through bull's-eyes — an important safety and control feature.*
- *End thrust taken on two large, hardened steel surfaces, also flood lubricated.*
- *Modern precision boring for exact oil clearance keeps lubrication at top efficiency.*
- *Wheel speed changes possible without readjusting bearings.*
- *Extremely low unit pressure, due to long, continuous bearing surfaces, permits fast cutting and enduring accuracy.*

For further facts on how Norton cylindrical grinders can benefit your production, see your Norton Representative. Or write

direct for Catalogs. And remember: only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass. In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

To Economize, Modernize with NEW

NORTON
GRINDERS and LAPPERS

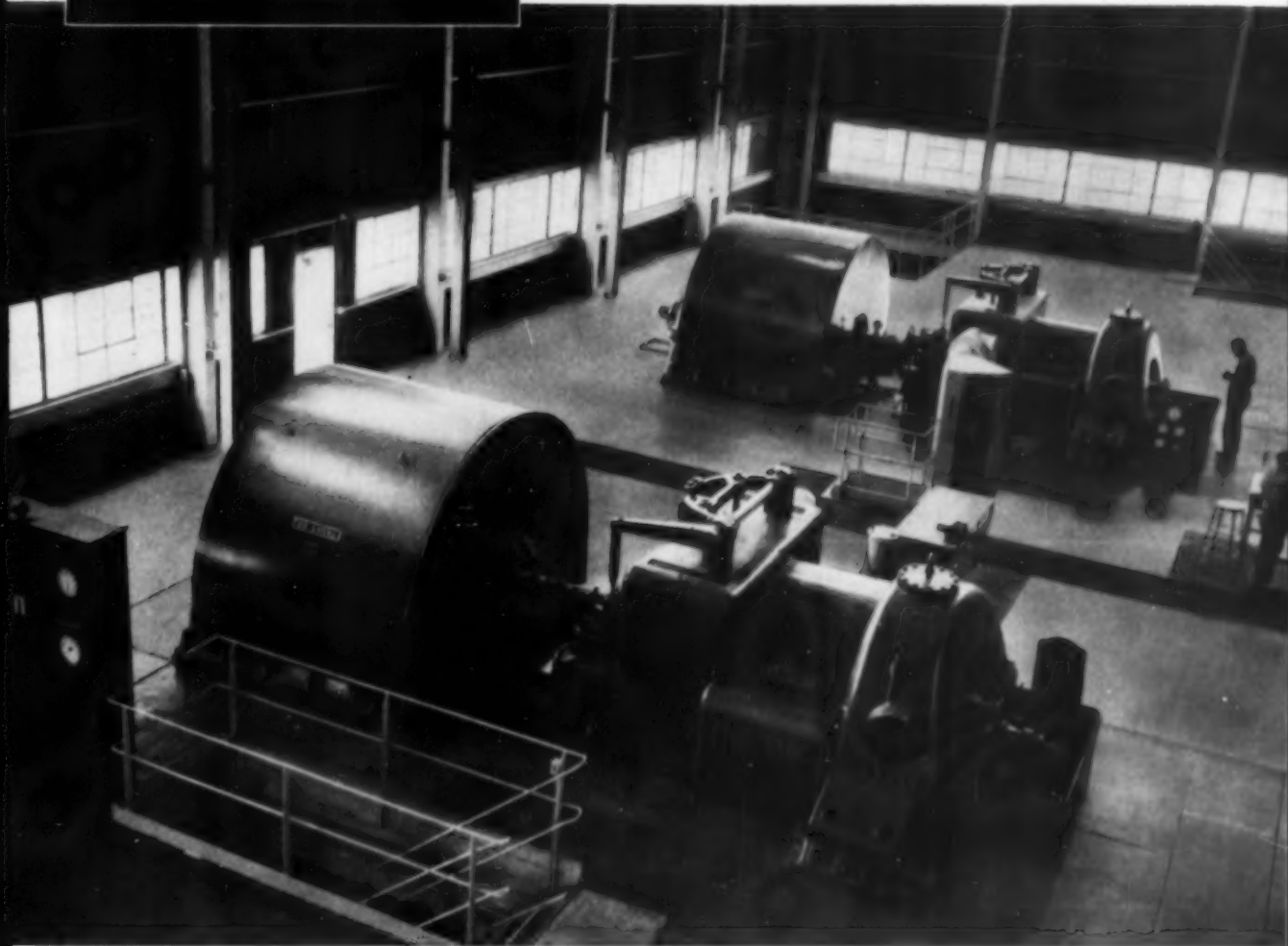
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to make your products better*

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(Teterboro, N. J.) • Cleveland • Chicago • Detroit

DE LAVAL

BLAST FURNACE
BLOWERS

*deliver 110,000 cfm each
for McLouth Steel*



These two De Laval turbine-driven centrifugal blowers do a round-the-clock job in the McLouth Steel plant, Trenton, Michigan. Each has a rated capacity of 110,000 cfm of air; discharge pressure is 30 psig. Each is driven by a 12,400 hp, 2950 rpm De Laval steam turbine operating under steam conditions of 600 psig, 825 F with 2" hg.

De Laval compressors are designed individually for each application to assure maximum efficiency and range of operation. Construction is rugged throughout. Casings and perfectly

balanced rotors are built to take punishment. All parts are precision-made to limit gages. Materials are selected which will best meet the particular conditions of corrosion, pressure and temperature.

De Laval centrifugal blowers are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem.



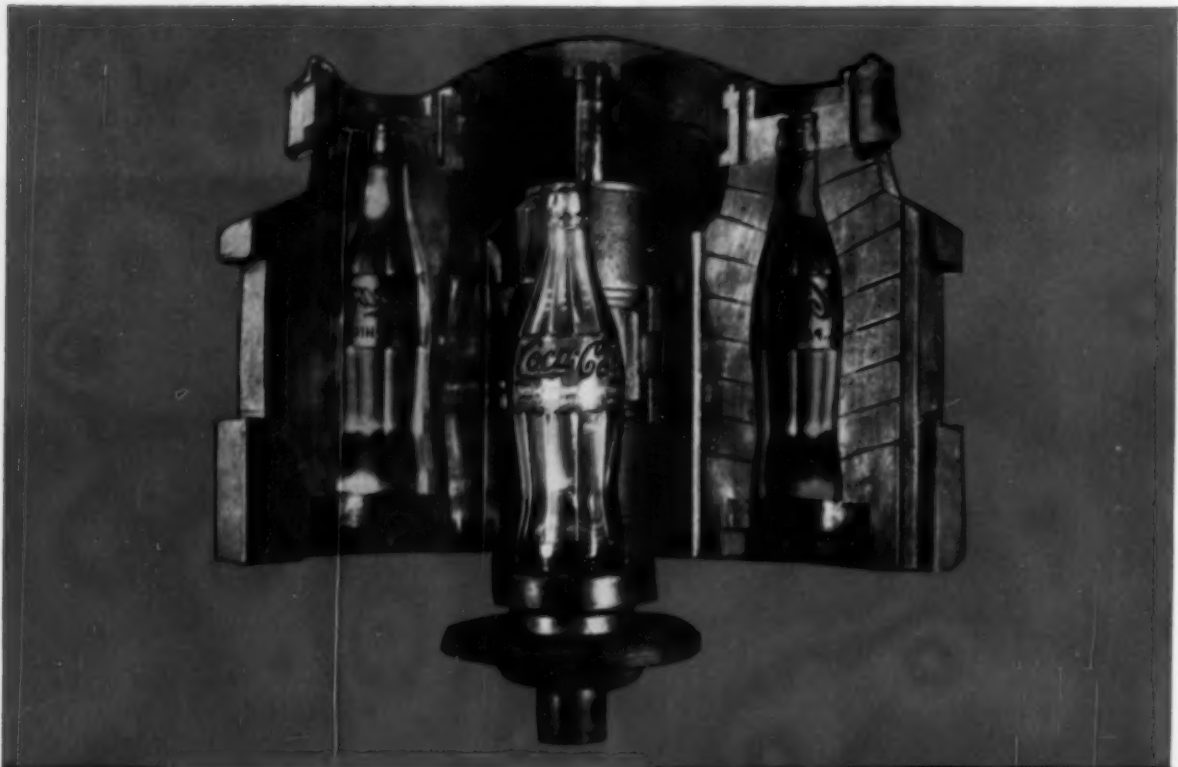
*Send for
Bulletin 0504*



DE LAVAL *Centrifugal Blowers*

DE LAVAL STEAM TURBINE COMPANY

860 Nottingham Way, Trenton 2, New Jersey



This glass mold, for a famous bottle, illustrates the fine surface finish and freedom from flaws and porosity. Good molding practice and the use of Chateaugay Pig Iron in every heat have reduced losses to less than 1% at Overmyer Mould Company.



REPUBLIC



World's Widest Range of Standard Steels

How Chateaugay Pig Iron helps glass-mold foundry cut losses to less than 1%

It takes a good pig iron to meet the rigid casting requirements of Overmyer Mould Company, Winchester, Indiana, producers of molds for manufacturers of glass containers.

The molds are machined and hand finished to obtain extremely smooth surfaces. Some molds call for a tolerance of $+.002$ to $-.000$. Therefore, the castings must be perfect from a density standpoint. The slightest flaw or evidence of porosity would cause them to be rejected. Yet, Overmyer is able to keep its loss rate under 1%.

How do they do it? By using Republic Chateaugay Pig Iron in every heat, including heats of nodular iron. The company has found through actual experience that there is no better nor more economical

means for insuring flaw-free, easy-to-machine castings.

Chateaugay is a low-phosphorus, copper-free pig iron. Its highly uniform distribution of chemical elements assures a dense, fine grain structure throughout every casting, regardless of size or shape.

Overmyer's foundry superintendent points out that in addition to providing good densification, fine surface finish, heat-resistance, high strength and top machinability, use of Chateaugay results in a high carbon iron, which supplies lubricating qualities so essential in glass molds.

A Republic Pig Iron Metallurgist will be glad to show you how Chateaugay consistently outperforms other pig irons. There's no obligation. Just mail the coupon.



LESS SPACE is required for storing a wide variety of parts when you use Republic Wedge-Lock Steel Shelving. Joints are designed to grow tighter as load increases, permitting higher stacking without distortion or instability. Result is efficient use of floor space plus easy rearrangement to meet changing requirements.



LESS HAZARDOUS lifting operations are the result when the proper type of chain sling is used. Republic can furnish the proper type and accessories for all applications in alloy or high carbon steel, and wrought iron. Because each type has a specific use, we recommend talking over your requirements with a Republic Chain Engineer.



LESS COST per year of service is just one feature of Republic Materials Handling Equipment. Rugged steel construction assures long, efficient service. The complete line includes all types of boxes, skids and pallets. Republic Materials Handling Specialists will work with you in designing special units to meet your specific requirements.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-2259
3120 East 45th Street
Cleveland 27, Ohio

- Please have a Pig Iron Metallurgist call.
Send more information on these Republic Products.
 Steel Shelving Chain Slings
 Materials Handling Equipment


Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

INSULATING FIRE BRICK	Temp. Limit	Density (lb/cu ft)	Strength (cold crushing, psi)	Conductivity (lb/in. sq. ft. hr. at 1000F mean temp.)
JM-3000	3000F*	64	400	3.20
JM-28	2800F*	58	150	2.50
JM-26	2600F*	48	190	2.22
JM-23	2300F*	42	170	1.91
JM-20	2000F*	35	115	1.22
JM-1620	1600F*	29	70	1.02
	2000F**			
Sil-O-Cel [®] Super	2500F**	40	300	1.95
Sil-O-Cel C-22	2000F**	38	700	1.88
Sil-O-Cel 16L	1600F*	34	350	1.07



*Back-up or exposed
**Back-up only

From Johns-Manville refractory research...

insulating fire brick with balanced properties for unsurpassed heat-control effectiveness

The nine types of insulating fire brick produced by Johns-Manville offer furnace builders and operators a common advantage—*balanced properties!*

The Johns-Manville insulating brick formulated for your service gives you the ideal combination of physical and thermal properties without sacrificing one for the other. This means you get unsurpassed heat-control effectiveness... greater economy in furnace design... hours saved

in reaching operating temperatures!

For a good example of the value of *balanced properties*, take the proved performance of JM-3000 insulating fire brick. Formulated for 3000F temperature service, this insulating fire brick has unusual load bearing strength, high spall resistance, low shrinkage and thermal conductivity proportionate to its density.

Johns-Manville has two strategically located plants for the production

of insulating brick: Lompoc, California and Zelienople, Pennsylvania. Insulating brick are available from the stocks of authorized J-M distributors in key industrial areas.

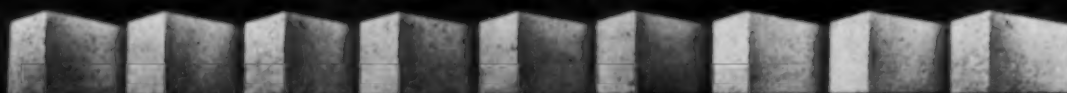
For complete information, call your nearest J-M representative. Or write for brochure IN-115A to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.



Johns-Manville

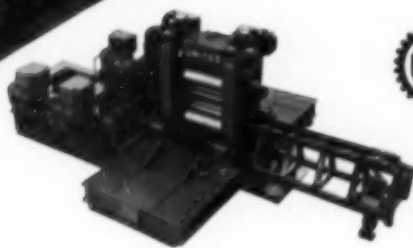
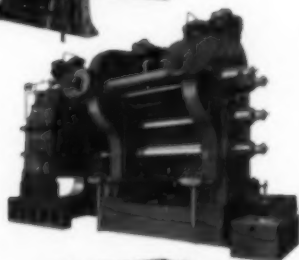
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INSULATING REFRACTORY PRODUCTS**

THE INDUSTRY'S MOST COMPLETE LINE OF INSULATING FIRE BRICK



JM-3000 for temperatures to 3000F JM-28 for temperatures to 2800F JM-26 for temperatures to 2600F JM-23 for temperatures to 2300F JM-20 for temperatures to 2000F JM-1620 for temperatures to 1600F exposed to 2000F back up Sil-O-Cel Super for temperatures to 2500F back up Sil-O-Cel C-22 for temperatures to 2000F back up Sil-O-Cel C-16L for temperatures to 1600F back up or exposed

*this
character
is a
customer*



And a dogged good one, too! Last year he gave the industry that supplies his nourishing meals, orders for 2,107,500 tons of prepared dog foods. To package all that required hundreds of tons of tinplate, aluminum foil, plastics film and paper products. Rolling mills, paper mills, plastics manufacturers, and the various fabricators, shared in the order right down the line.

We did too, because we build mills that roll out strips of shining tinplate a mile or more in length in less than 60 seconds; aluminum foil mills; plastics processing equipment, and paper making machinery. Some of our equipment most certainly helped to fill that order.

United Mills and equipment can help you fill orders not only for packaging, but for any purpose under the sun requiring the processing of steel, aluminum, copper, brass, plastics, wood or paper products.

Call us when modernization or expansion is in the air. We can be of help.

UNITED

**ENGINEERING AND FOUNDRY
COMPANY**

Pittsburgh, Pennsylvania

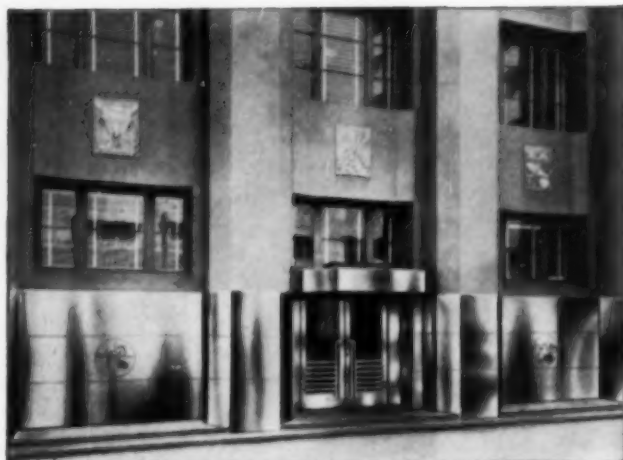
*Plants at Pittsburgh, Vandergrift, Youngstown, Canton,
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*SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Co., Inc., Aurora, Indiana*

*Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls,
Auxiliary Mill and Processing Equipment, Presses and other heavy machinery.
Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.*

Wherever people give a building
a beating

outside



or

inside



That's the place to use **STAINLESS STEEL**



Write for your copy
"STAINLESS STEEL for
STORE FRONTS and
BUILDING ENTRANCES"

If modernization or new construction is on your mind, this 40-page booklet contains many ideas on handsome treatments for you. (Note: A new booklet on "AL Stainless in Food Preparation and Serving Equipment" is in process—write for one of the first copies when available.)

Address Dept. S-80

You *have* to design for maximum attractiveness in those areas of buildings which have most traffic—such as building fronts, marquees, entrances, lobby details, railings, etc. Yet those same places are exactly the locations where you need maximum utility, too.

What's the *best* material to use? Just remember that stainless steel—and *only* stainless steel—gives you the nearest-to-perfect combination of satiny beauty and rugged toughness. No other material is as good-looking and at the same time as

strong, hard-surfaced and resistant to rust or discoloration. No other material requires as little maintenance, cleans as easily and lasts as long.

In short, whether you're considering AL Stainless Steel for just the "hard-wear" spots or for an entire curtain-wall design, keep this fact in mind: *no other material costs as little over the long pull as stainless steel.*

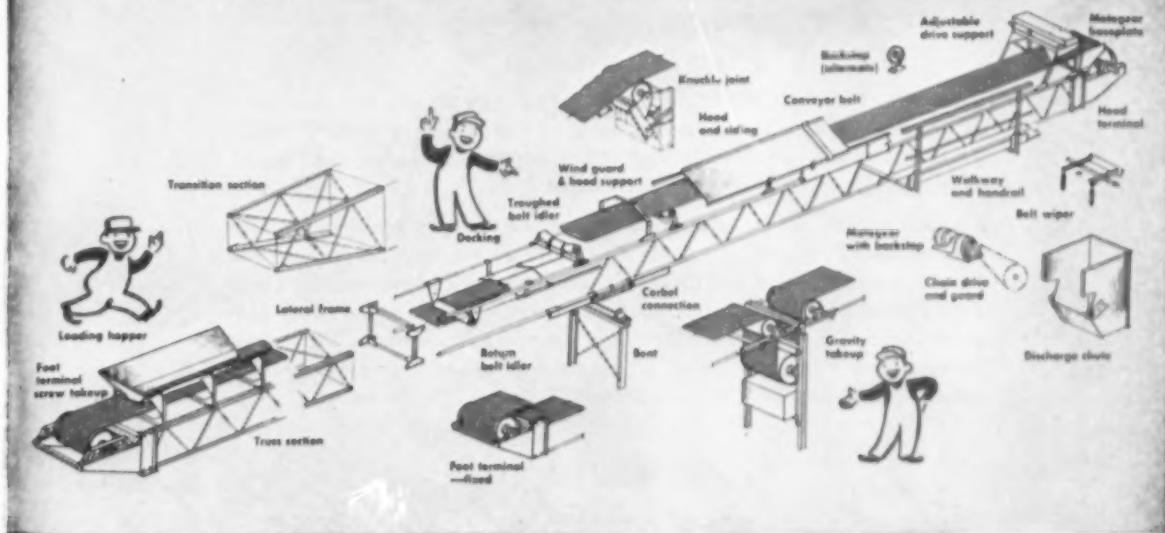
Let us give you any information or technical assistance you may require.
*Allegheny Ludlum Steel Corporation,
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For Stainless Steel in ALL Forms—call
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W&W 5209 C Warehouse stocks carried by all Ryerson Steel plants

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**Standard 18, 24, 30 and 36-inch widths
need no special engineering**

Here's an economical, standardized belt conveyor "package" . . . ready to meet the majority of belt conveyor needs and perform dependably for years and years. It combines standard Link-Belt products with sectional truss frames and steel supporting bents.

Book 2579 has further data on Link-Belt PRE-BILT conveyors . . . with drives up to 40 hp and 24 and 42-inch truss depths. Write today, or ask for a copy at your nearest Link-Belt office.



easy selection

Your Link-Belt representative will help you select the best combination of PRE-BILT sectional belt conveyor components.

LINK-BELT
BELT CONVEYOR EQUIPMENT

16.114



prompt quotations

He will prepare a comprehensive and accurate estimate of requirements for installations that permit "on-the-ground" survey.

simplified purchase

Parts are standardized, interchangeable, all available from one supplier. Link-Belt representative can furnish all data.

quick delivery

PRE-BILT conveyors are built at nine strategic locations throughout the country and are shipped from the plant nearest you.

fast installation

Can be readily handled by your own erectors in most cases. Link-Belt can also furnish complete erection service and supervision.

LINK-BELT COMPANY, Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

SAMUEL T. WELLMAN was a horrified onlooker the day everything went wrong with the first open hearth furnace he had helped to build. Troubles reached their climax when the steel spilled out over molds, cars and tracks, welding everything into one mass as it chilled.

This was in 1868. A year later, Wellman built a 5-ton open hearth furnace for the Bay State Iron Works, at South Boston. He used a much deeper bath and an arrangement of small ports, side by side with thin walls between, which gave a good mixture of gas and air. This furnace worked, and for years after produced ingots of the highest quality. It was America's first commercially successful open hearth furnace. Today, steel's greatest expansion is in open hearth capacity, increasing 36% between 1946-1955, to 110,234,160 net tons.

Great Names in Steel Making #II

Steel men respect success wherever met. But their special recognition is given to men and products that have helped the progress of steel.

An interesting example of this is the name "Gear Shield." In America there are mills in which the same gears have been lubricated with Gear Shield for 35 and 40 years. In consequence, the name has come to be so synonymous with satisfactory lubrication that other makers frequently refer to their lubricants as "gear shields" even though Gear Shield is the exclusive trade mark and product of The Ironsides Company.

Paralleling developments in open hearth production since Samuel Wellman's first 5-ton furnace, Ironsides rolling mill lubricants have advanced far from the first heavy grease "shield," hand-paddled onto open gears. Encased gears now demand lubricants that can be poured, pumped and jetted. Free-running characteristics have become important in view of the enormous power consumption of today's big mills. At the same time, loads have increased until special Ironsides Shield is now being formulated for pressures as high as 25,000 psi. Shield for the roll necks is still

being made of high melting point fatty base material, as it was 60 years ago, but is now formulated with close consideration to its pumpability. Water repellency, a consideration ever since the first rolling of hot steel, is of extreme importance in both roll neck and roller bearing shields.

In consequence, Ironsides engineers have become "custom tailors" of lubricants formulated for the specific conditions and preferences of the individual mill. They are accustomed to working closely with the superintendent, roller and lubrication engineer, on problems involving anything from a pail to tank car shipments.

If you have a problem, they'd like to help you lick it. Just address, or phone, The Ironsides Company, Columbus 16, Ohio.



By the makers of Palmoshield
"the palm tree that grows in Ohio"



Jos. Margulies.



Gardner-Denver workman inserting a Johnson sleeve bushing in a compressor piston.



Gardner-Denver Air-cooled Compressors are noted for quality all over the world.

Johnson Bronze Sleeve Bearings Help Gardner-Denver Maintain Quality Standards

Since its founding in 1859, the Gardner-Denver Company has made it a policy to provide machines of the best possible quality. Under this policy the company has grown to be one of the world's largest manufacturers of air compressors and pumps. Contributing to the Gardner-Denver reputation for quality is the durability of the Johnson Bronze sleeve bearings which are incorporated in their products.

High quality Johnson bearings are used in some

of the finest machinery being built today. Not only do they contribute to the high quality of the finished products, but they also facilitate production—for Johnson bearings are held to close tolerances and shipments are made on schedule. If you are having quality or delivery problems with your present bearings, let us show you how Johnson can help you. For detailed information, write Johnson Bronze Company, 550 S. Mill Street, New Castle, Pennsylvania.

Johnson Bearings



LEDALOYL
(powder metallurgy)



ALUMINUM ON STEEL



BRONZE ON STEEL



STEEL AND BABBITT



CAST BRONZE

ANOTHER SCI AKY FIRST .

PRECISION CONTROL

for Resistance Welding
as accurate as the time signals
of the U. S. Naval Observatory

**Now, Satisfy Your Most Rigid
Production Standards on
Long or Short Runs**

The Sciaky Predetermined Electronic Counter Weld Control employs a Dekatron tube to count the cycles of power line frequency and impulses of secondary current in predetermined absolute numbers and without deviation. Since power line frequency is maintained by reference to Naval Observatory time signals, you get these same standards of accuracy with the new Sciaky Control. Welder functions are *CENTRALIZED* — only one Dekatron tube is used to control succeeding functions such as "squeeze, weld, hold, and off".

The Sciaky Predetermined Electronic Counter Weld Control is absolutely consistent. Positive adjustment snap switch control dials are calibrated in cycles and impulses. You set the number of cycles and impulses you want and you get them throughout the longest or shortest run—and you can easily reproduce them at any time.

Unitized, plug-in sub-assembly units are used to simplify maintenance and make it possible to add welder functions easily. In either case, down time is limited to the few minutes it takes to plug in a spare assembly or the additional units desired.

To find out more about this revolutionary new control ask to see your Sciaky Sales Engineer or write for Bulletins No. 338 and No. 339. There's no obligation.

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4909 W. 67th St., Chicago 38, Ill.
POrtsmouth 7-5600**



Sciaky Roll Spot and Seam Welder equipped with the Sciaky Predetermined Electronic Counter Weld Control.

*Largest Manufacturers
of Resistance Welding Machines in the World*

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HOUGHTON
DEVELOPMENT
IN PACKING DESIGN**



**HOMOGENEOUS
RUBBER**



**FABRICATED
RUBBER**



LEATHER

**STANDARD STACK HEIGHT
for "V" Packings**

Good news for the designer! This new packing development standardizes the stack height of all Houghton "V" packings. Simply determine the number of packings needed in the gland (according to your pressure requirements) . . . then allow for the specified dimension in your drawing. Whether you use homogeneous rubber, fabricated rubber or leather "V's" . . . they'll fit!

You can forget "special" dimensions set up by various packing manufacturers for particular types of packings. Standardize on stack

height with packings from Houghton and you'll save time and money from the drawing board on!

The leadership in hydraulic know-how is typical of Houghton, which supplies all types of hydraulic and pneumatic packings, as well as a complete line of hydraulic oils and fluids.

Standardize on Houghton. You'll get the newest first—and the best always. Call your Houghton Man and let him explain Houghton's Hydraulic Service. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

... product of



Ready to give you
on-the-job service . . .

CINCINNATI
BICKFORD
SUPER SERVICE
Radials

CINCINNATI
BICKFORD

**For faster
metal
drilling...**

This ultra-modern
head... CHARTS and
PRE-SELECTS PROPER
SPEEDS and FEEDS

Built in 4 foot to 8
foot arm, 13 inch to
19 inch column.
Spindle speeds may
be as low as 8 RPM or
as fast as 1750 RPM.

You chart, you control, you speed up operations and have a record for reference with this advanced head. The prescheduling chart plans sequence of operations and is a complete guide for the operator. Instant, quiet, hydraulic selection and changes of 36 speeds and 18 feeds are preselected by two convenient, easily read dials. Controls for clamping of column, arm and head, and arm elevation by power are at the operator's finger tips.

*Write for Bulletin R-33 describing this
ultra-modern tool*

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BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION
GIDDINGS & LEWIS MACHINE TOOL COMPANY
OAKLEY, CINCINNATI 9, OHIO, U.S.A.

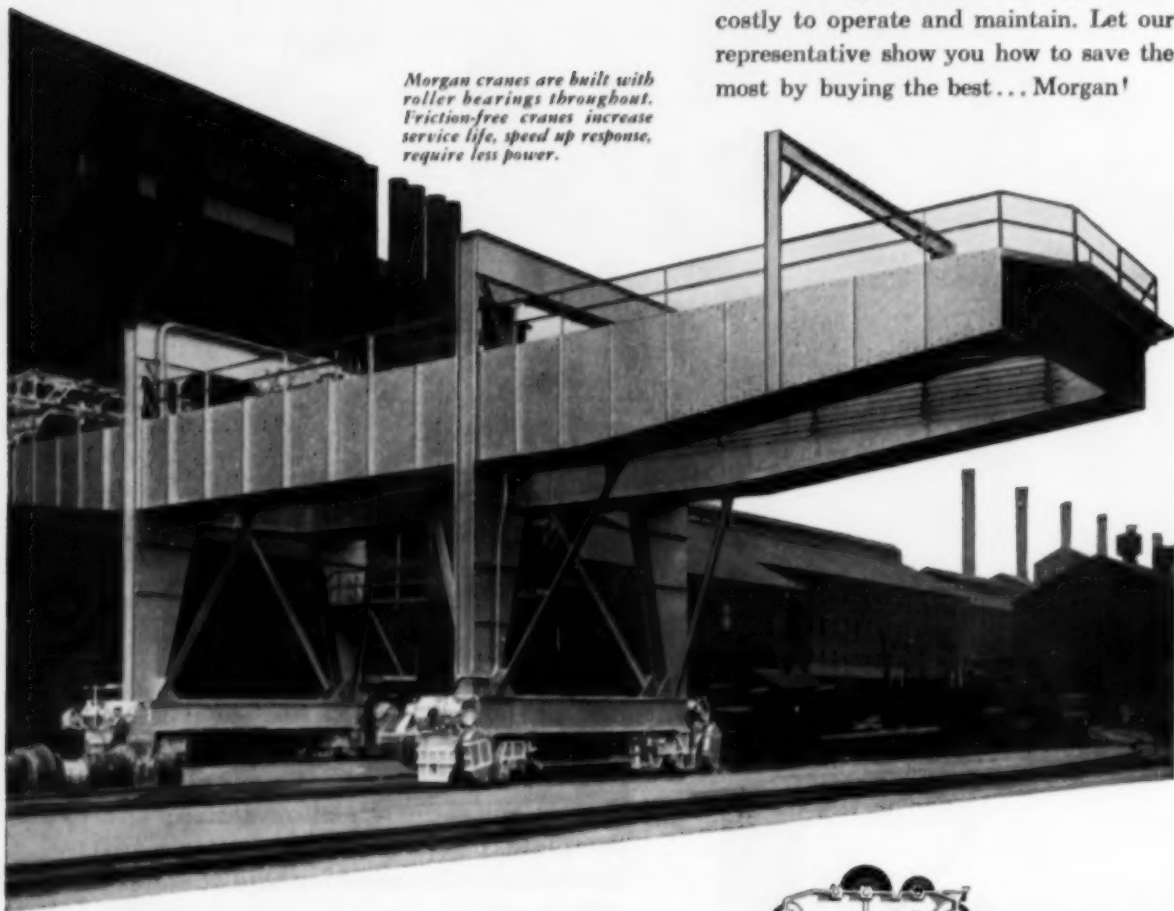
How Morgan keeps cranes "rolling"

● MORGAN "Anti-Friction Engineering" keeps cranes rolling by providing precisely correct bearings and mountings for each specific application . . . your assurance of longer trouble-free operation, lower maintenance costs.

"Anti-Friction Engineering" is another vital link in the chain of features that makes Morgan cranes best in the business.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!

Morgan cranes are built with roller bearings throughout. Friction-free cranes increase service life, speed up response, require less power.

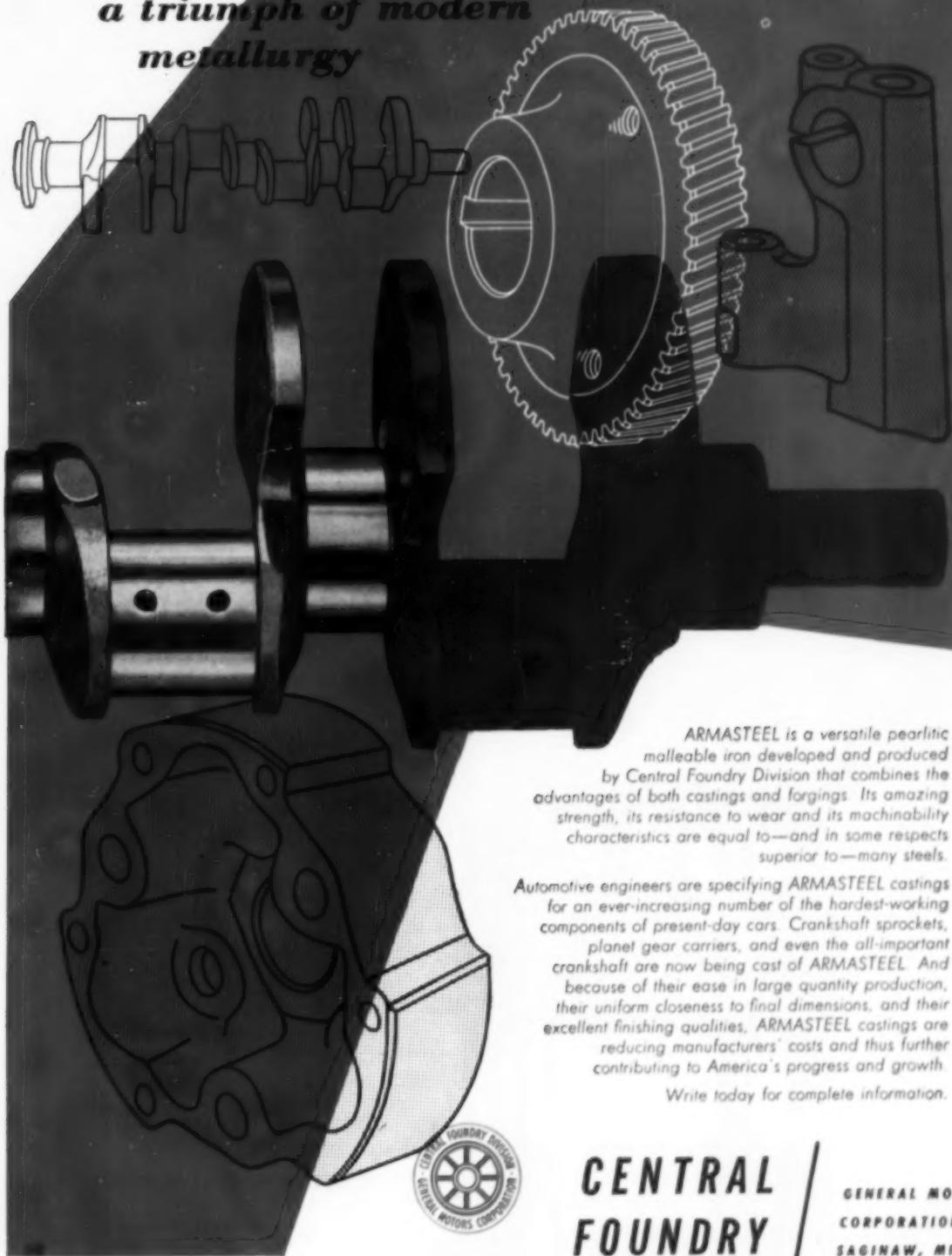


The Morgan Engineering Company, founded in 1888, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE
MORGAN
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ARMASTEEL

*a triumph of modern
metallurgy*



ARMASTEEL is a versatile pearlitic malleable iron developed and produced by Central Foundry Division that combines the advantages of both castings and forgings. Its amazing strength, its resistance to wear and its machinability characteristics are equal to—and in some respects superior to—many steels.

Automotive engineers are specifying ARMASTEEL castings for an ever-increasing number of the hardest-working components of present-day cars. Crankshaft sprockets, planet gear carriers, and even the all-important crankshaft are now being cast of ARMASTEEL. And because of their ease in large quantity production, their uniform closeness to final dimensions, and their excellent finishing qualities, ARMASTEEL castings are reducing manufacturers' costs and thus further contributing to America's progress and growth.

Write today for complete information.

**CENTRAL
FOUNDRY
DIVISION**

GENERAL MOTORS
CORPORATION
SAGINAW, MICHIGAN
DEPT. 30

ERIE PRESS OF THE MONTH

HYDRAULIC FORGING PRESS

CASE HISTORY #4 A long-time Erie Foundry customer asked us to build a hydraulic forging press for flat die steel forging and planishing. The press had to be rugged, but fast acting.

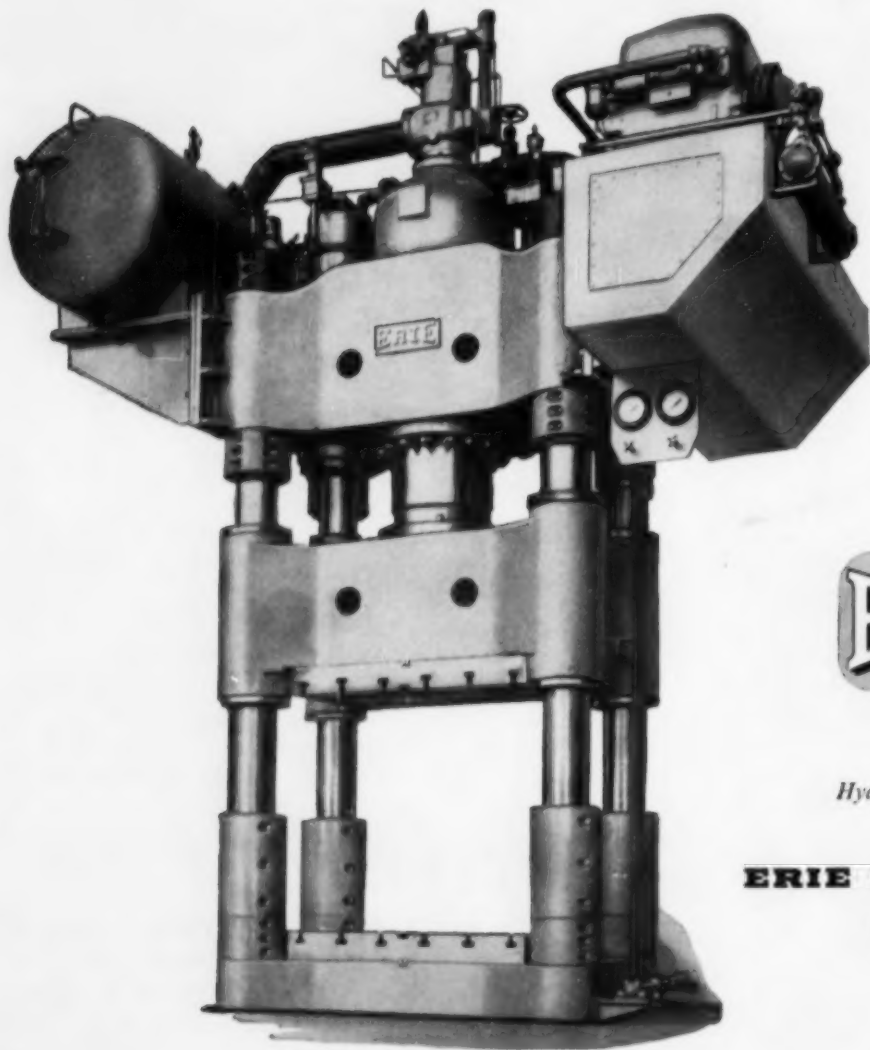
Erie Foundry Hydraulic Engineers conferred with their colleagues who design and build Erie forging hammers. These conferences determined the most exacting requirements to which a hydraulic press could be subjected and from this knowledge emerged this 750-ton forging press.

When the press is used for planishing operations, a selector switch on the instrument panel turns the full oil volume from the main ram to two auxiliary cylinders which are then operated by the same hand controls. A

special high-speed filling valve in the prefill system used in conjunction with a pressurized large capacity prefill tank—allows the press to operate at the very fast speed of 60 planishing strokes per minute.

The main, or forging ram—23-inch diameter—operates at a full capacity with a 36-inch maximum stroke. The press is operated by two hand levers, one controls the displacement of the pump, and the other controls the moving platen.

Erie Foundry Hydraulic Press Engineers are continually designing and building special purpose hydraulic presses. Call them when you feel that the proper hydraulic press will expedite your production.



ERIE

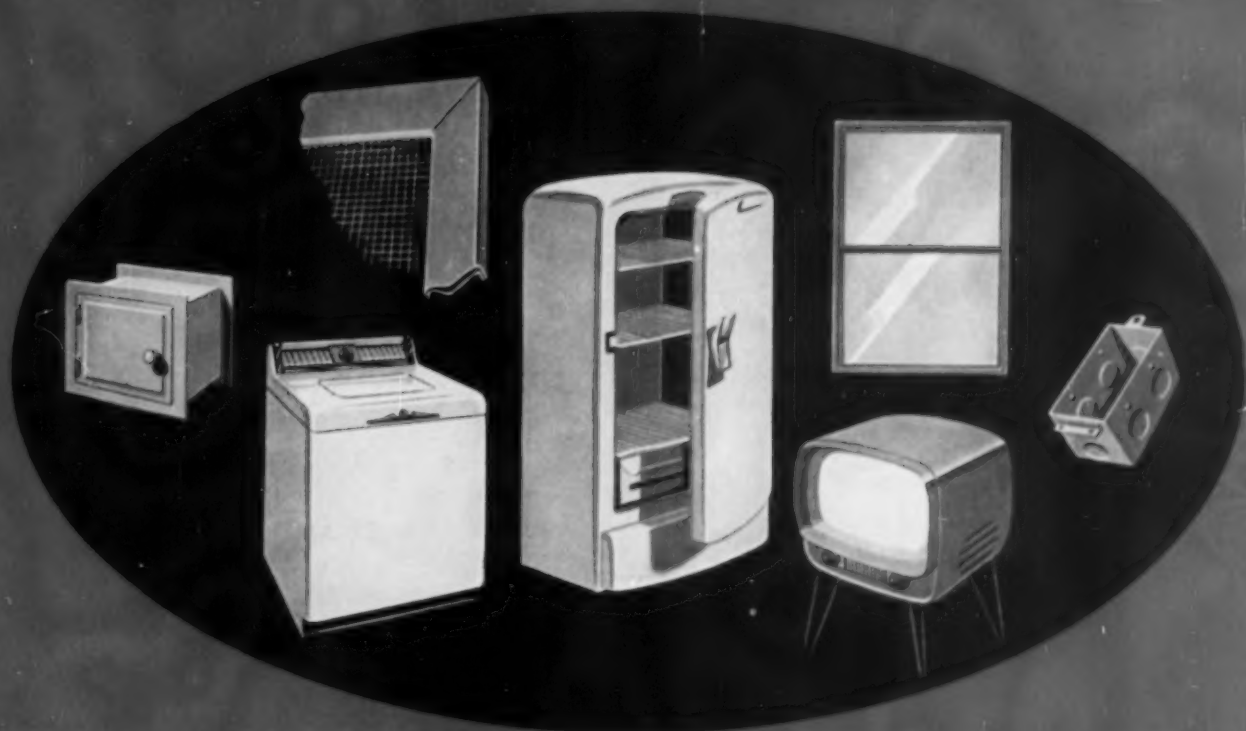
SINCE 1895

Hydraulic Press Division

ERIE FOUNDRY CO.

ERIE, PA.

In the long run, galvanized steel . . .



In the longer run, **WEIRKOTE**

More and more, Weirkote is proving itself to manufacturers of a wide variety of products—under the sternest tests—as a galvanized steel that goes far beyond ordinary galvanized steels.

A special continuous galvanizing process is quality-controlled all the way to make Weirkote withstand the severest stresses of fabrication. Its tightly bonded zinc coat resists cracking, peeling, flaking; resists corrosion for moisture cannot penetrate to attack the steel underneath.

And Weirkote's greater strength, rigidity and heat-resistance provide longer life with little or no maintenance.

So for durability, economy, appearance . . . in the longer run, Weirkote is your best buy. Put it to work now improving your product . . . and your profits!



WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA
a division of

NATIONAL STEEL CORPORATION



Bigger Loads...

Less Spillage



...more Productive capacity

It's the amount of bulk-material *delivered* per shift or per day that counts, and the new model HA "PAYLOADER" tractor-shovel has proven in plant after plant that it consistently delivers more material faster and at less cost than heavier machines with larger engines.

A big reason for this superior performance is the roll-back bucket action that scoops up heaping loads and carries them *low*. Another, is the exclusive built-in hydraulic shock absorber that cushions the load during travel — reducing spillage and allowing higher travel speeds.



Gets more: Forty degree tip-back of bucket at ground level gets heaped loads.



Keeps more: Maximum bucket tip-back is reached *before* bucket is raised—less spillage at pile.



Carries more: Exclusive hydraulic shock absorber cushions the load during transport — less spillage while carrying.



"PAYLOADER" superiority on bulk-material handling work is the result of 34 years of pioneering and leadership in tractor-shovel manufacture. "PAYLOADER" is also the complete, proven line — from 14 cu. ft. to 2¼ cu. yd. capacity — a size for every purpose. There is a nearby Distributor ready to serve you.



PAYLOADER

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



Delivers more: You start with a bigger load and—what's more important—arrive with a bigger load.



FREE . . .

Owner reports of
PAYLOADER
 performance

This booklet contains performance reports of "PAYLOADER" tractor-shovels in a variety of plants and applications. A copy will be sent on request, without obligation.

THE FRANK G. HOUGH CO.

676 Sunnyside Ave., Libertyville, Ill.

- Send "PAYLOADER" Reports booklet
- Literature on Model HA (18 cu. ft.)
- Literature on larger models—to 2¼ cu. yd.

Name _____

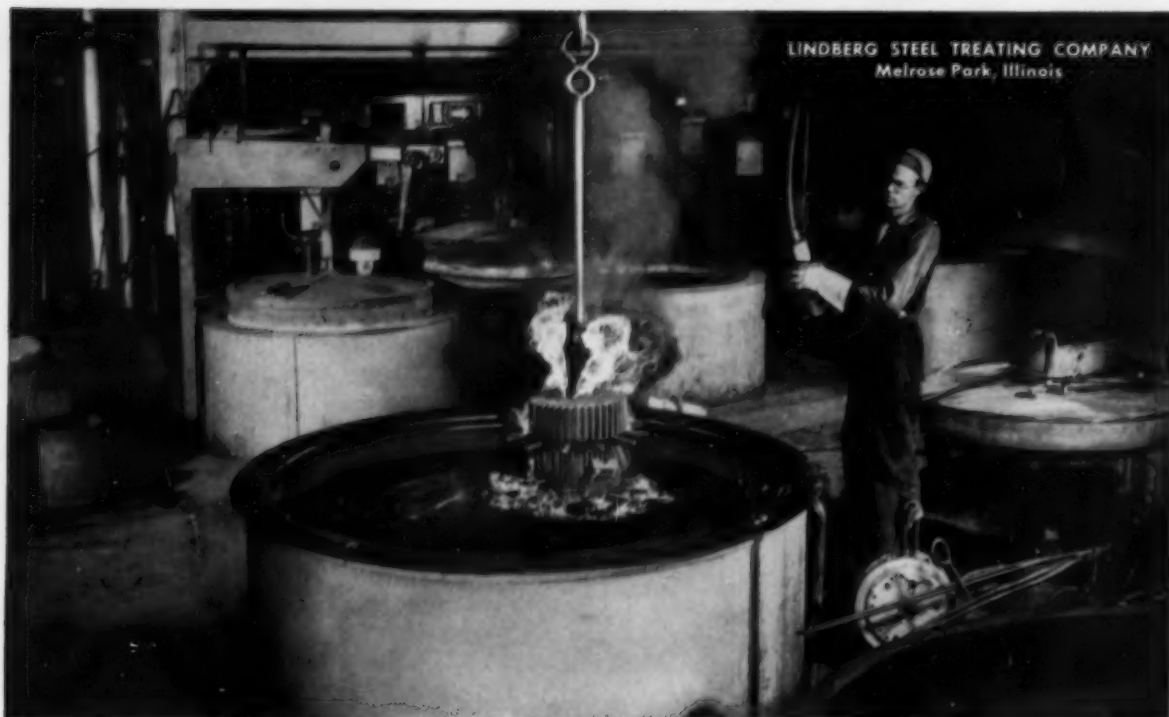
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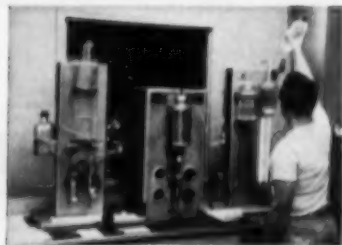
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City _____

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For machine shop tolerances— Lindberg uses Cities Service Quenching Oil



Lindberg's Lab stringently tests treated metals. Dimensional changes from poor quenching oil would quickly show up here. But Cities Service Quenching Oil cools metal with no significant dimensional change.



Some of Lindberg's Furnaces. Here, they heat-treat all kinds of steel products . . . bolts, washers, gear blanks, saw blade segments, etc. Steel for bars of Illinois State Penitentiary was one of their first jobs.

At Lindberg Steel Treating Company a routine order might include a dozen shafts, stamping and forming dies, jigs and fixtures and even production parts. But though the products might differ, most would carry the same stipulation—heat treat with very low dimensional change.

To some heat treating operations this might present a problem, but not to Lindberg. By the use of Cities Service Quenching Oil, they're able to cool their steel with no significant changes in dimension.

"In addition," say Lindberg metallurgists, "we like Cities Service Quenching Oil because it has high flash point, consistent viscosity, excellent oxidation resistance, and a stable cooling rate."

Anyone looking for a better quenching oil would do well to try this superior Cities Service oil. For further information, talk with your local Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

STEEL



WASTE

on overweight cast or forged circular parts can pile up operating expenses. "Slim" Cleve-Weld welded components can cut your costs.

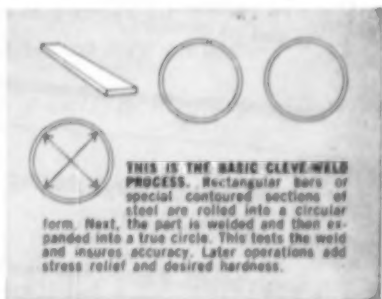
You save three ways on circular parts from Cleve-Weld

1. Waste costs are cut up to 30% over bulky cast or forged parts.
2. Finished machining time is reduced to a minimum.
3. Your overall production is speeded.

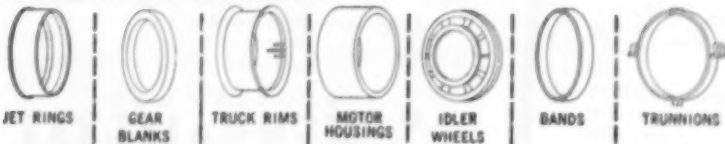
From simple gear blanks to special alloy jet rings, the Cleve-Weld Process gives the same results—better performance and reduced

costs. In some cases, the savings in machining time and material waste pay for the finished Cleve-Weld part.

Find out the full story on how Cleve-Weld's 45 years of design, metallurgical and production experience can save you money, too. Write, telephone, or send drawings to: Circular Welded Products Sales Department, at the address shown below.



EXAMPLES OF CLEVE-WELD PROCESS PRODUCTS



SEND THIS COUPON NOW

Cleveland Welding Division—Dept. 5T-68
West 117th Street and Berea Road
Cleveland 11, Ohio

Please send me your Cleve-Weld Process Brochure.

Name _____

Title _____

Attach to your company letterhead and mail

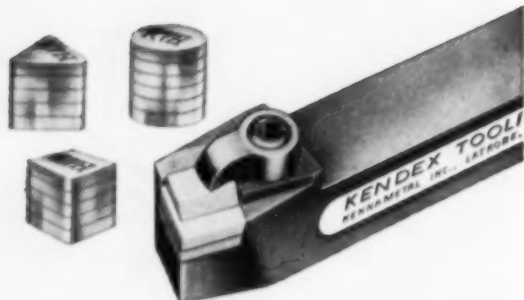


CLEVELAND WELDING DIVISION
AMERICAN MACHINE & FOUNDRY COMPANY
West 117th Street & Berea Road, Cleveland 11, Ohio

Here's more proof that KENNAMETAL* K7H

is the best carbide
cutting grade . . .

- ✓ for high velocity machining
- ✓ for cutting heat-treated and high tensile steels



Use Kendex Tooling with turn-over inserts (available in 17 styles and over 200 tools) . . . for lowest cost per cutting edge.

1

"Hard-to-machine" steel part finish bored 4 times faster with better dimensional control and better finish

OPERATION: Machine component of forged high nickel-chromium-tungsten content finish bored on a 62" King Boring Mill to size 38" diameter by 23 1/4" long, with a .014" feed and 3/16" depth of cut.

OLD TOOLING—Results: A special brazed shear tool with a competitive carbide, operating at 70 sfm, became very dull and produced only a fair finish with a slightly tapered bore.

WITH K7H—Results: A K7H cutting insert on a Kendex KSBL Holder, operating at 300 sfm (four times faster than with the previous competitive carbide), showed very little wear and provided an excellent finish with a straight bore.

2

Plunge and rough cutting heat-treated steel

OPERATION: Plunge and rough turning a heat-treated 1045 steel cylindrical machine part, operating at 350 sfm, with a .024" feed and 3/16" to 1/4" depth of cut.

OLD TOOLING—Results: Carbides previously used produced only 30 to 35 pieces per cutting edge.

WITH K7H—Results: A K7H throw-away type insert in a Kendex tool produced 110 pieces per cutting edge, with much lower tip and holder mortality.

3

K7H produced 8 to 12 times more pieces at twice the speed

OPERATION: A machine tool manufacturer ran this operation on 280 Brinell Hy-ten B-3X steel, with a .021" feed and 1/4" depth of cut.

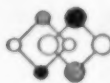
OLD TOOLING—Results: Brazed tools using a competitive grade of carbide, operating at 210 sfm, cut only 2 to 3 pieces per grind.

WITH K7H—Results: K7H inserts on a Kendex Holder, averaged 25 pieces per cutting edge operating at 500 sfm.

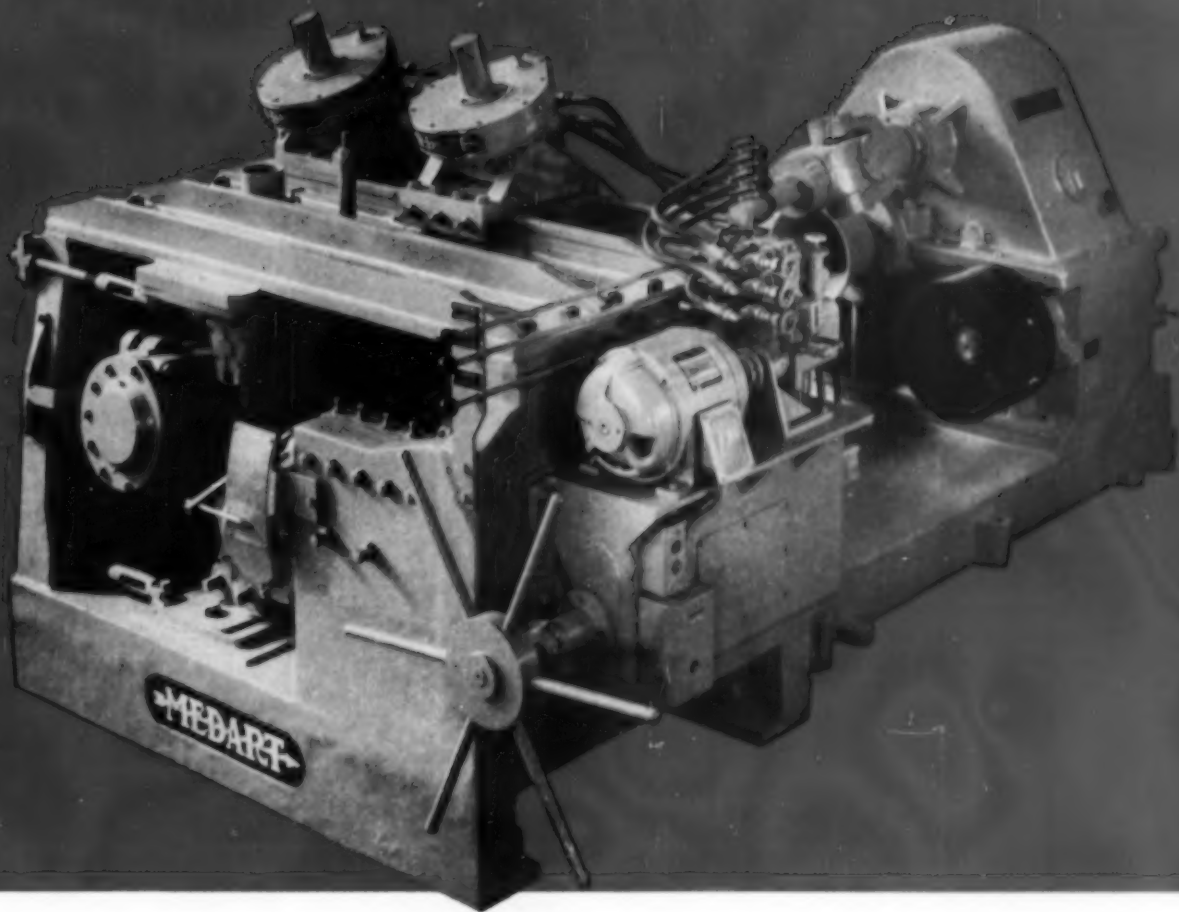
The above results are typical performances of Kennametal Grade K7H on job after job. K7H has phenomenal strength (three times that of nonmetallics—even at high temperatures), top resistance to shock plus unusual resistance to wear and cratering. Try it on your hard-to-machine and high velocity jobs. A Kennametal tool engineer will be glad to assist you. Why not call him or write KENNAMETAL INC., Latrobe, Pa.

*Registered Trademark

0-2227



INDUSTRY AND
KENNAMETAL
...Partners in Progress



BLAW-KNOX MEDART makes what it takes

for continuous, high speed straightening, sizing and polishing

You can meet the most rigid requirements for cold finishing round bars, pipes and tubes with a Blaw-Knox Medart 2-roll Rotary Straightener. Designed to perform with the greatest accuracy, it straightens, "super-finishes," and corrects out-of-roundness in one operation.

Processing begins the instant the workpiece enters the rolls and continues right up to the very end. Because of this you can straighten

short lengths as well as longer standard mill lengths. A modified straight roll then deflects the workpiece into the concave roll giving it a tremendous number of straightening cycles per foot, assuring precision straightening and sizing.

And this highly accurate finishing can be delivered at throughput speeds up to 350 ft/min. Operation is continuous by means of end-to-end feeding. The drive motor can be

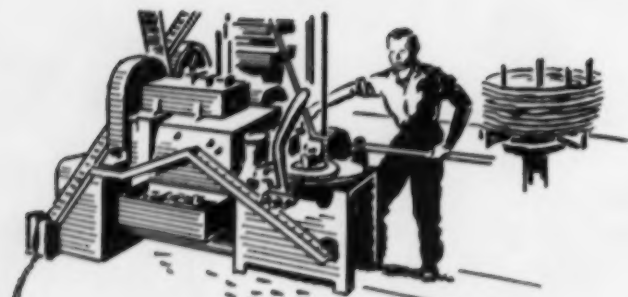
reversed with the bar between rolls to permit additional passes for sizing and polishing.

The speed, versatility, and accuracy of Blaw-Knox Medart 2-roll Rotary's have made them the standard of the industry. Available in ten sizes, they can handle workpieces from 1/4" to 9" diameter. Contact us for detailed information, technical assistance or service.

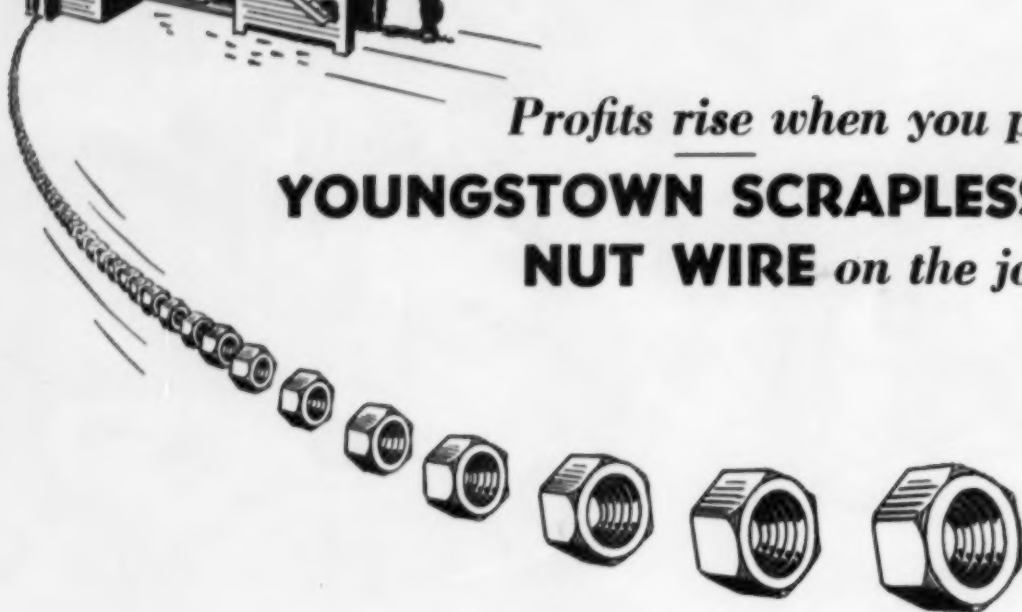


BLAW-KNOX COMPANY
Foundry and Mill Machinery Division
 Blaw-Knox Building • 300 Sixth Avenue
 Pittsburgh 22, Pennsylvania





Profits rise when you put
YOUNGSTOWN SCRAPLESS
NUT WIRE *on the job!*



"Production up—rejects down which increased our over-all profit." We hear this story over and over from leading cold heading operators who specify and rely on Youngstown Scrapless Nut Quality Wire. It comes to your shop free from all piping, injurious seams, laps, die marks, internal tearing and cupping, and non-metallic inclusions—all of which defects skyrocket your reject rate.

Remember, because Youngstown controls all its processes, from ore mining to bundling

of the finished wire, it's your guarantee for a continuous production of high quality, brightly polished nuts. Its smooth, strong coating prolongs die life thus minimizing costly die replacements.

Youngstown Scrapless Nut Quality Wire is immediately available in standard AISI as well as special resulfurized steels. Also, Cold Heading Bolt Wire, of the same high Youngstown quality, is supplied in all standard carbon analyses. Phone or write today to our nearest District Sales Office for any additional help or information.

Youngstown



SCRAPLESS NUT QUALITY WIRE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

*Manufacturers of
Carbon, Alloy and Tool Steel*

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

Why Sterling adds a sixth element to your grinding wheel formula



YOUR GRINDING WHEEL's performance is determined by the five elements that make up its specification: abrasive grain, size, grade, structure, and bond. But in determining the precise formulation of these five elements, Sterling always considers a *sixth element*.

The sixth element is the *human element*: the operator himself, his work habits, personal preferences, and all the other little things that make your job unique. Considering the vital sixth element may mean the difference between success and failure on any grinding operation.

Sterling grinding wheels—formulated with the sixth element in mind—can cut your grinding costs, reduce grinding time, and get maximum production from your machines. That's why it's sound practice to call in a Sterling Abrasive Engineer, or your nearest Sterling Distributor, for a complete study of your grinding operation. Do it soon.

Sharpening tools and cutters like this milling cutter is cooler, easier with Sterling vitrified cup wheels.



"Wheels of Industry"—Vitrified and Resinoid
—to meet the exact requirements of industry.

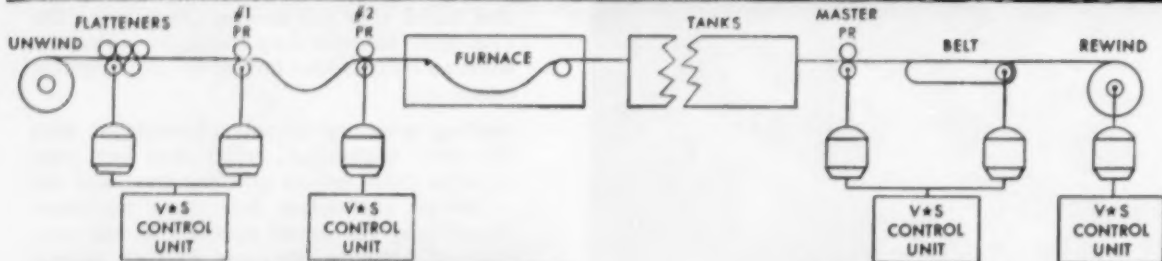
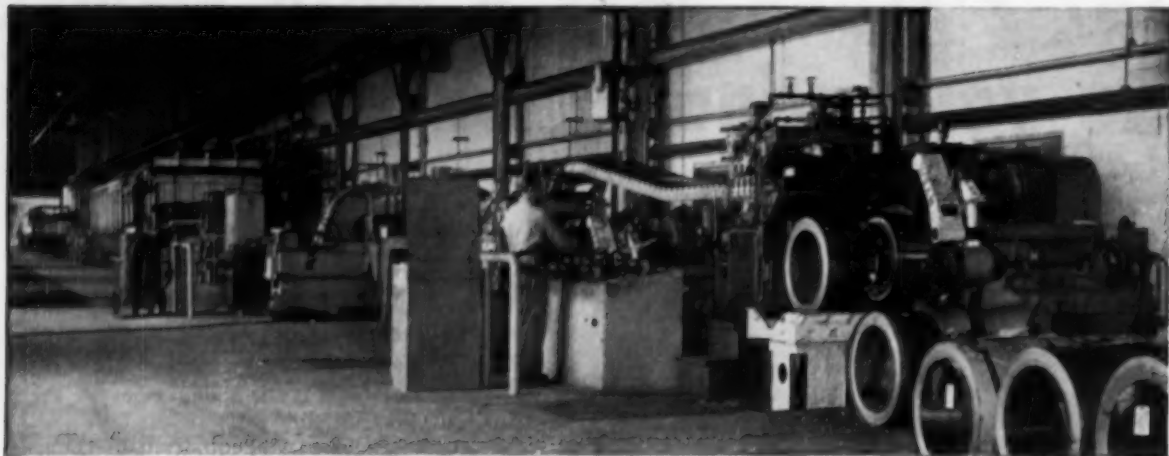
STERLING

GRINDING



WHEELS

STERLING GRINDING WHEEL COMPANY, TIFFIN, OHIO—SUBSIDIARY OF ABRASIVE AND METAL PRODUCTS COMPANY



Pickling Line V*S Drive Control Units



PACKAGED DRIVES KEEP STAINLESS ON THE MOVE

As much as 14 miles of stainless steel strip is processed each day on the Atlas Steels, Ltd. two-strand pickling line . . . Canada's first continuous stainless steel pickling line.

Because this is a large stainless line requiring special care to prevent surface marring or scratching, consideration had to be given to the drive system. The drive requirements were for precisely controlled tension over wide speed ranges with extremely reliable control. Reliance V*S Drives with built-in electronic regulators keep the line moving and afford the flexibility to permit line speeds from 5 to 50 feet per minute for strip .007 to .187 inches thick and 10 to 20 inches wide.

Four compact V*S Control Units which house the fac-

tory-wired motor-generator sets and the control panels supply power to the motors for each half of the twin line. The "packaged" feature of the drive means extreme ease of installation and a great saving in installation cost plus the ability to tailor the drive system to the actual requirements. This "tailoring" meant that wide constant-horsepower speed range motors could be used to fit in with the line speed variables. These variables were created by the need for running strip of varying thicknesses and widths through the line at speeds dictated by the annealing furnace "constant tons per hour" limits.

This is a good example of the ability of Reliance to tailor drive systems to the specific application requirements of the steel industry. Write for Bulletin A-1555. D-1000

RELIANCE ELECTRIC AND ENGINEERING CO.

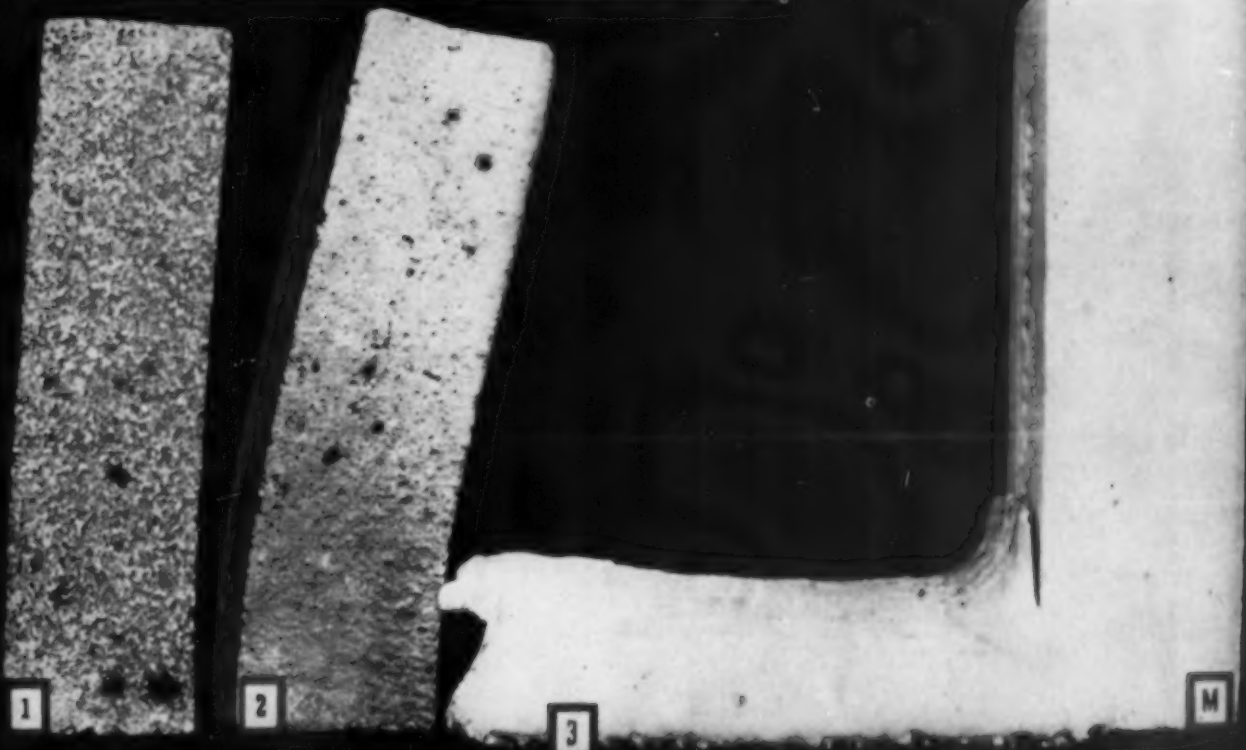
DEPT. 48A, CLEVELAND 10, OHIO • CANADIAN DIVISION: WELLAND, ONTARIO

Sales Offices and Distributors in Principal Cities

Builders of the Tools of Automation

Held at 3000°F for five hours, these four brick, commonly recommended to resist high temperatures, show varying effects. Samples 1, 2, and 3 softened and slumped to different degrees, indicating loss of usefulness even below this temperature. Sample 4, a Mullfrax® electric furnace mullite refractory, is unaffected by the heat.

fourth in a series . . . **HEAT RESISTANCE**



Unusual Properties of Refractory Materials

Heat Resistance—Exposed only to heat, Carborundum's Super Refractories can actually be used with complete safety at temperatures above 3000°F. Long before such temperatures are approached, even high heat duty and super-duty firebrick lose much of their usefulness. That's because they begin to soften several hundred degrees below their theoretical safe limits. Not so Carborundum's Super Refractories. Their strength and rigidity are maintained close to their theoretical limits.

In practice, of course, you must contend with many more conditions than heat alone. Corrosion, thermal shock, load, abrasion, erosion, etc., are usually combined with temperature. This combination of conditions may tend to lower heat resistance of refractories. That's why a refractory cannot be selected solely on its ability to withstand temperature. It also explains the reason Carborundum offers so many specialized refractories.

Heat resistance is thoroughly explored in the forthcoming issue of Carborundum's new magazine "Refractories." Send for your copy today.

CARBORUNDUM

Registered Trade Mark

VALUABLE INFORMATION FOR USERS OF:

REFRATORIES • CASTABLE CEMENTS • POROUS PLATES AND TUBES
CATALYST SUPPORTS • OXIDE, BORIDE, NITRIDE AND CARBIDE
HIGH-TEMPERATURE MATERIALS • CERAMIC FIBER

all in the new magazine "Refractories"

-----MAIL THIS COUPON TODAY-----

Dept. W86, Refractories Division

The Carborundum Company, Perth Amboy, N. J.

Please send me the forthcoming issue of "Refractories."

Name _____ Title _____

Company _____

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City _____ Zone _____ State _____

You can make it better



BUILT OF USS TRI-TEN STEEL, seven huge tainter gates in the Dexter Reregulating Dam near Lowell, Oregon, control water flow for power supply on the Willamette River. Each gate—made in four pre-assembled sections and site welded—is 44 ft. wide and 38 ft. 7 in. high. Shipping weight is approx. 116,000 lbs. USS TRI-TEN Steel was selected for this important installation because of its high yield strength—which permitted the use of lighter weight plates and shapes—and also on account of its higher corrosion resistance—equal that of copper steel. (Gates fabricated by Willamette Iron & Steel Co., Portland, Ore., for the Portland District of the Corps of Engineers.)

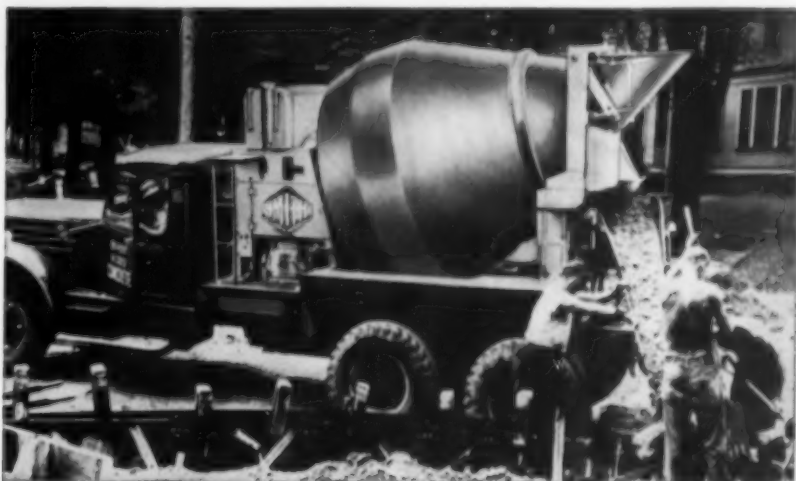


IN FARM EQUIPMENT, like this Rol-A Dam dammer built by Gunning Manufacturing Co., Lansford, N. D., the use of USS High Strength Steels in vital parts effectively increases life and dependability. Here, USS MAN-TEN Steel in the dammer blades provides superior abrasion resistance plus lightweight and extra strength and toughness. As one manufacturer puts it, "Because farm equipment takes terrific abuse in the field and is generally exposed to the weather without any protection whatsoever, we have found high strength steel construction a 'must'."

with USS High Strength Steels



CORROSION RESISTANCE is important in sign poles like this manufactured by C. J. Glasgow Company, Detroit, Mich. Due to the method of construction and design of upright and sign, the inside cannot be kept painted and is subject to corrosive damage. Built with USS COR-TEN Steel, which has 4 to 6 times the resistance to atmospheric corrosion of carbon steel, poles last 2 to 3 times longer. The higher strength of COR-TEN Steel also makes it possible to use steel in lighter gages, saving weight which reduces shipping costs and makes erection easier.



RESISTANCE TO ABRASION, plus the added strength and corrosion resistance supplied by USS MAN-TEN Steel, greatly reduce maintenance and add years of service life to the drum of this highly efficient concrete mixer, built by the T. L. Smith Company, Milwaukee, Wis. MAN-TEN Steel's ability to resist the grinding action of stone, sand, slag and cement is so generally recognized that the use of MAN-TEN Steel in drums has become almost standard construction by leading manufacturers of truck mixers.

IN USS HIGH STRENGTH STEELS, design engineers have at their command three service-tested steels that will permit them to materially increase the efficiency and economy of machinery, equipment and structures at little or no increase in first cost . . . and frequently, at a saving.

All three of these famous "steels that do more" — USS COR-TEN, USS MAN-TEN and USS TRI-TEN — have a 50% higher yield point than ordinary carbon steel. All have better corrosion resistance and offer greater resistance to wear, fatigue and impact. Each, however, has specific superior properties that should be considered in determining its selection.

USS COR-TEN Steel, for example, is distinguished by its superior resistance to atmospheric corrosion—4 to 6 times that of carbon steel. USS MAN-TEN Steel is intended for weight reduction by means of greater strength in moderate forming applications, with enhanced resistance to abrasion and atmospheric corrosion. USS TRI-TEN Steel's outstanding characteristics are excellent weldability and resistance

to shock at low temperatures.

Used singly or in combination, these steels can advantageously replace carbon steel to increase the strength and durability of vital parts *without* increasing their weight. Or when the use of thinner sections is feasible they can (1) reduce equipment weight without reducing its strength, or (2) increase the size and capacity of equipment without increasing total weight or the power required to move it.

You will find our 174-page "Design Manual for High Strength Steels" extremely useful in applying the benefits of these steels to your product. Send for free copy—simply write on your company letterhead to United States Steel Corporation, Room 5454, 525 William Penn Place, Pittsburgh 30, Pa.



UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
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USS HIGH STRENGTH STEELS

USS MAN-TEN • USS COR-TEN • USS TRI-TEN

UNITED STATES STEEL



HELIARC Cutting

TRADE-MARK

CUTS ALUMINUM AT SPEEDS UP TO 300 INCHES PER MINUTE

HELIARC cutting, a new process developed by LINDE, brings all the desired features of economical high-speed operations to the cutting of aluminum.

★ **Speeds never before possible:** Normal mechanized cutting speeds are 300 in. per min. in $\frac{3}{4}$ -in. material, 125 in. per min. in $\frac{1}{2}$ -in. material, 75 in. per min. in $\frac{3}{4}$ -in. material, and 50 in. per min. in 1-in. plate. If desired, lower speeds can be obtained by simply adjusting the controls.

★ **Straight lines, bevels, contours—no problem:** The new HELIARC cutting process can be used mechanically or manually. Both setups produce high-quality straight line


cuts, bevels, circles, and shapes with revolutionary new speed and efficiency.

HELIARC cutting employs a high-temperature, high-velocity, constricted arc between a tungsten electrode and the piece to be cut. The concentrated, columnated energy of the arc stream melts and ejects a thin section of metal to form a kerf. The gas atmosphere (a combination of argon and hydrogen) prevents oxidation of the cut face.

Learn the details of how HELIARC cutting can help you increase production and cut operating costs. Call your LINDE Representative today.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street  New York 17, N. Y.

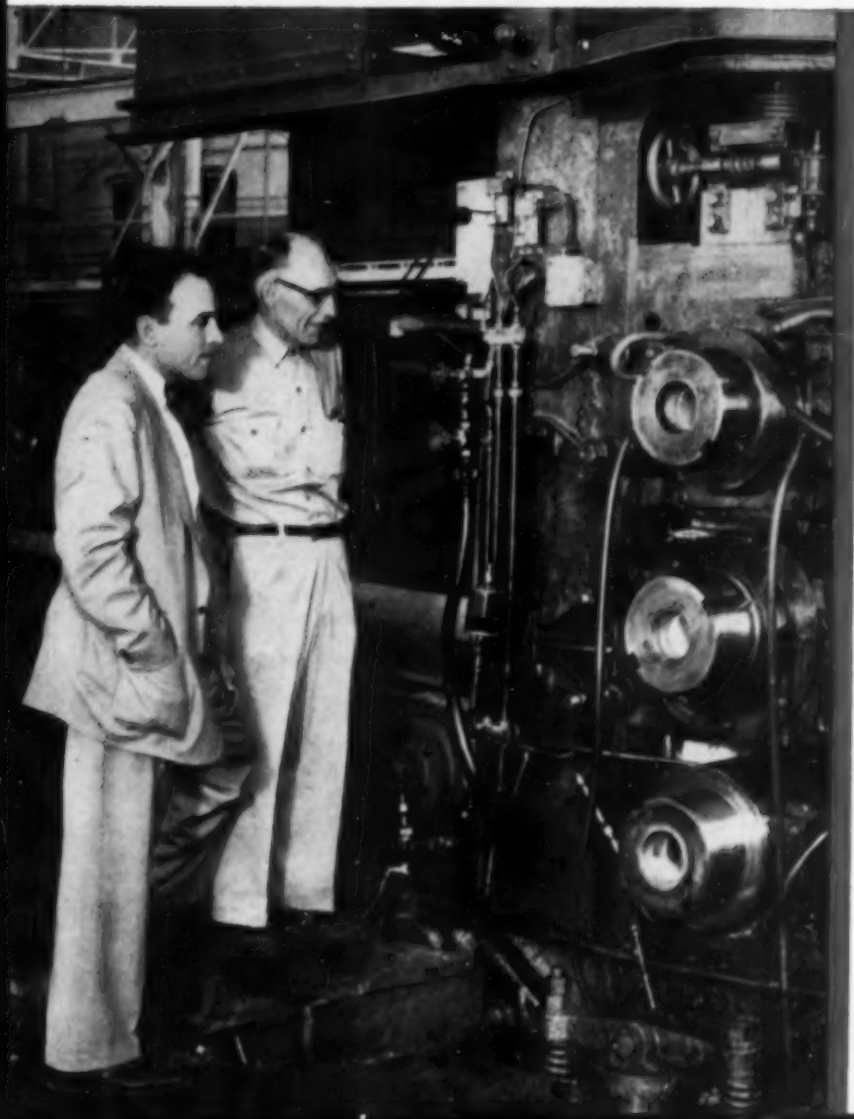
Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

"Heliarc" and "Linde" are registered trade-marks of Union Carbide and Carbon Corporation.



Sick slab roll recovers fast with application of STANOGEAR Compound



A slab roll at Matthiessen & Hegeler Zinc Company, La Salle, Illinois, was sick. It suffered from repeated roll neck bearing failures. Bearing temperatures couldn't be controlled. A consultant was summoned—Marshall J. Fox, Standard Oil lubrication specialist. His diagnosis and remedy: Install STANOGEAR Compound and equip the machine with a central pressure system for application. Recommendations were followed. Result: No bearing failures, due to faulty lubrication, since. Maintenance costs reduced. Time lost through breakdowns slashed.

This was a condition made to order for STANOGEAR to remedy. And Matthiessen & Hegeler knew there was a man at hand who could suggest what should be done. It's another demonstration of what this unbeatable combination can do when put to work:

- 1 Standard Oil lubrication specialists capable of giving technical help.**
- 2 Top quality products that deliver results required.**

STANOGEAR Compounds contain special additives making them suitable for applications where heavy loads cause welding, seizure or scoring.

In the Midwest and Rocky Mountain states, a Standard Oil lubrication specialist in your nearby Standard Oil office will gladly give you more information about STANOGEAR. Call him. Or contact Standard Oil Company, 910 So. Michigan Avenue, Chicago 80, Ill.

Eugene Ewald (right), Mill Foreman, and Marshall Fox, Standard Oil lubrication specialist, inspect slab roll. STANOGEAR Compound helped solve lubrication problem on roll neck bearings.

Marshall Fox who proposed switch to STANOGEAR with resultant improved operation, is experienced in providing such technical service. Marsh has a Mechanical Engineering degree from Purdue to qualify him for this work. In addition, he has completed Standard's course for sales engineers. This experience and training, customers find, pay off for them.



STANDARD OIL COMPANY

(Indiana)

(Advertisement)

SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER III—Lustrous, Corrosion-Resistant Finishing with Chemical Polishing Iridite

WHAT IS IRIDITE?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are widely accepted throughout industry as an economical means of providing corrosion protection, a good base for paint and decorative finishes for non-ferrous metals. Certain of these coatings also possess chemical polishing abilities that have luster-producing, as well as corrosion-inhibiting, effects on zinc and cadmium plate, zinc die castings and copper alloys. However, continued developments in this field have been so rapid that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this discussion of the many ways in which this chemical polishing characteristic can be used in final finishing or pre-plating treatments to produce a lustrous appearance with distinct display and sales appeal and appreciable savings in cost. Report I on decorative, corrosion-resistant finishes and Report II on paint base corrosion-resistant finishes are available on request.

The degree of luster possible on a surface is a function of the degree to which the surface can be smoothed. Leveling to provide a smooth surface can be achieved by mechanical or chemical means, or a combination of these, depending upon the luster desired and the original condition of the metal. Chemical polishing effectively imparts luster otherwise difficult and costly to obtain. For this reason, it is often used to supplement or entirely replace mechanical polishing, depending upon the application and the original condition of the metal. Chemical polishing has the additional advantage of providing overall treatment of the submerged part. It reaches into even the deepest corners and recesses that are otherwise inaccessible. Certain of the Iridites are specifically designed to perform this chemical polishing operation. Also, they provide corrosion protection as do all Iridites, thus may be used as a final finish or a pre-plating polish.

If Iridite is to be used as a final finish, in contrast to pre-plating treatment, the chromate conversion coating generated is allowed to remain, providing good corrosion resistance. Color inherent in these Iridite films ranges from a yellow cast to yellow iridescent. These coatings may be used without further treatment where this color is acceptable and good corrosion resistance is desired. Further, these basic coatings can be tinted by dyeing. Among the dye tints available are shades of red, yellow, blue and green. If desirable, the basic coatings can also be modified by a bleach dip leaving a clear bright or blue iridescent finish. In all cases bleaching reduces corrosion resistance.

As examples of this type of final finishing, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, lustrous chemical polishing of the as-cast surface of zinc die castings. Thus, in many cases, sizeable savings in finishing cost are realized by elimination of plating costs. This economical method can be used on tools, appliance parts, toy pistols, locks and many other small castings. Another example is the treatment of copper and brass parts, such as welding tips, to eliminate buffing and provide additional corrosion resistance. In many cases, handling costs are reduced appreciably by replacing piece-part handling with bulk processing. Still another example of the use of this chemical polishing and protective quality of Iridite is a simple system of zinc plate, Iridite and clear lacquer instead of more costly electroplated finishes. Typical of this type of lustrous finish are builders hardware and wire goods.

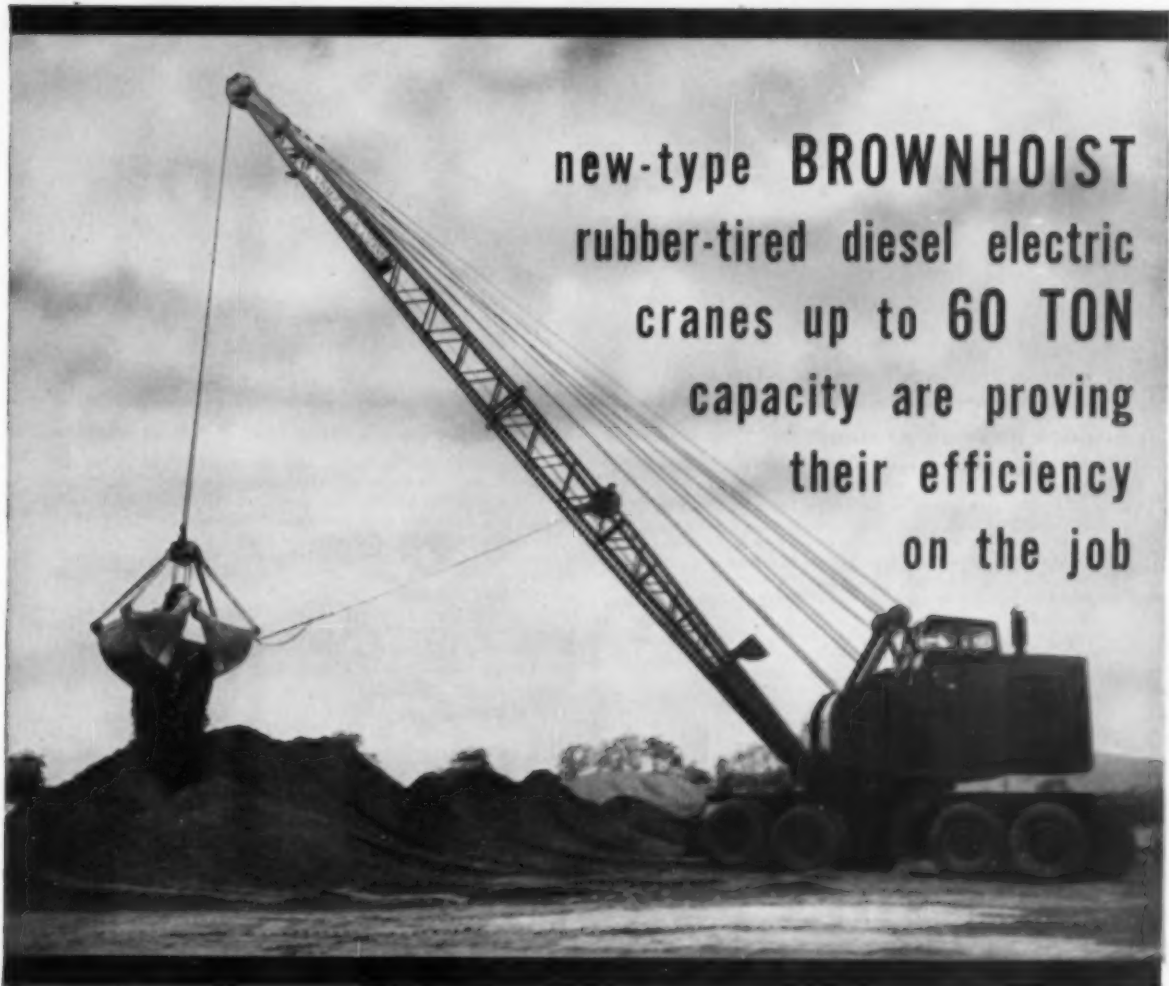
As a pre-plating treatment, in contrast to final finishes, Iridite can be used to chemically polish zinc die castings or copper prior to plating. In such cases, Iridite should be applied as an in-process step, so that the protective film is removed before the plating cycle. The savings in hand-

ling, material and labor costs are obvious. This process has made it practical to plate chrome directly over copper on steel, conserving nickel, yet producing a lustrous chrome finish. Used after stripping faulty plate in reprocessing zinc die castings, Iridite restores luster to the casting, thus making possible replating without blistering.

Other Iridite finishes are available to produce maximum corrosion resistance, a wide variety of decorative finishes and excellent bases for paint on all commercial forms of the more commonly used non-ferrous metals. As a final finish, appearance ranges from clear bright to olive drab and brown and many films can be bleached or dyed. As a paint base Iridite provides excellent initial and retentive paint adhesion and a self-healing property which protects bare metal if exposed by scratching. Iridites have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of their top performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product demands the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.



new-type **BROWNHOIST**
 rubber-tired diesel electric
 cranes up to **60 TON**
 capacity are proving
 their efficiency
 on the job

103

**BROWNHOIST MATERIAL
 HANDLING EQUIPMENT
 GIVES A LIFT TO
 AMERICAN INDUSTRY**



INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES:
 New York, Philadelphia, Cleveland, Chicago, Denver,
 San Francisco, Montreal • AGENCIES: Detroit,
 Birmingham, Houston

The new Brownhoist Wagon-Cranes are specifically designed to do an outstanding job wherever high mobility and high capacity are required. You'll see them at work performing heavy duty jobs in mines, quarries, steel mills, for railroad and lumber operations and for many other large industries. Equipped with dynamic clutch, anti-friction bearings at all essential points, power steering, electric travel and electric rotation. Mounted on a 12 wheel crane carrier capable of speeds up to 8 miles per hour, the unit can be operated by one man from easy-to-reach controls. Economical to operate. Available in capacities from 25 to 60 tons. For specification folder or further details, get in touch with our nearest representative or write us at Bay City.

SUBSIDIARY OF



BROWNHOIST



Intense heat no problem for Super Belts

This hydraulic press at Hackney Iron and Steel Co., Enid, Oklahoma, shapes red hot steel plate into tank heads.

The flat leather belt formerly used on this type of press, would stretch, slip, and come off. Tightening the belts only overloaded the bearings. For this press, a Gates Super Vulco Rope drive was chosen because it withstands the near-by intense heat, and its extra horsepower capacity permits lighter weight sheaves; thereby reducing load on bearings.

Claude King, maintenance superintendent, reports: "This Gates V-belt drive has operated 8 hours a day for 5 years without lost time due to maintenance."

Super Belts on vibrator last 7 times longer

James Gann, general superintendent of John B. LaGarde, Inc., Anniston, Alabama, reports:

"Practically every condition exists to shorten V-belt life on the vibrator drive of this concrete block machine. The machine starts and stops 4 times a minute. Intense vibration must be absorbed by the V-belts to protect motor and bearings. Sand and concrete, oil and grease all get into the drive.

"With Gates Super Vulco Ropes, we get about 7 times the average life we received from any other make. It is hard to believe that belts can take this punishment, but Gates Super Vulco Ropes do it."

Solve tough drive problems with this super tough V-belt

If present V-belts are wearing out too fast . . . if heavy shock loads . . . oil and heat . . . or other conditions are causing too frequent replacement . . . here's the answer:

Gates Super Vulco Rope—the oil and heat resistant V-belt with 40% more horsepower capacity. Easily handles heavy shock loads.

That means longer V-belt life and *cost savings two ways*—savings on belt replacements and savings on maintenance down-time.

Let a Gates V-Belt specialist help you solve *any* tough drive problem. He'll make recommendations without obligation. Gates offices and distributor stocks are listed in the phone book yellow pages in all major industrial centers. The Gates Rubber Co., Denver, Colorado—*World's Largest Makers of V-Belts.*



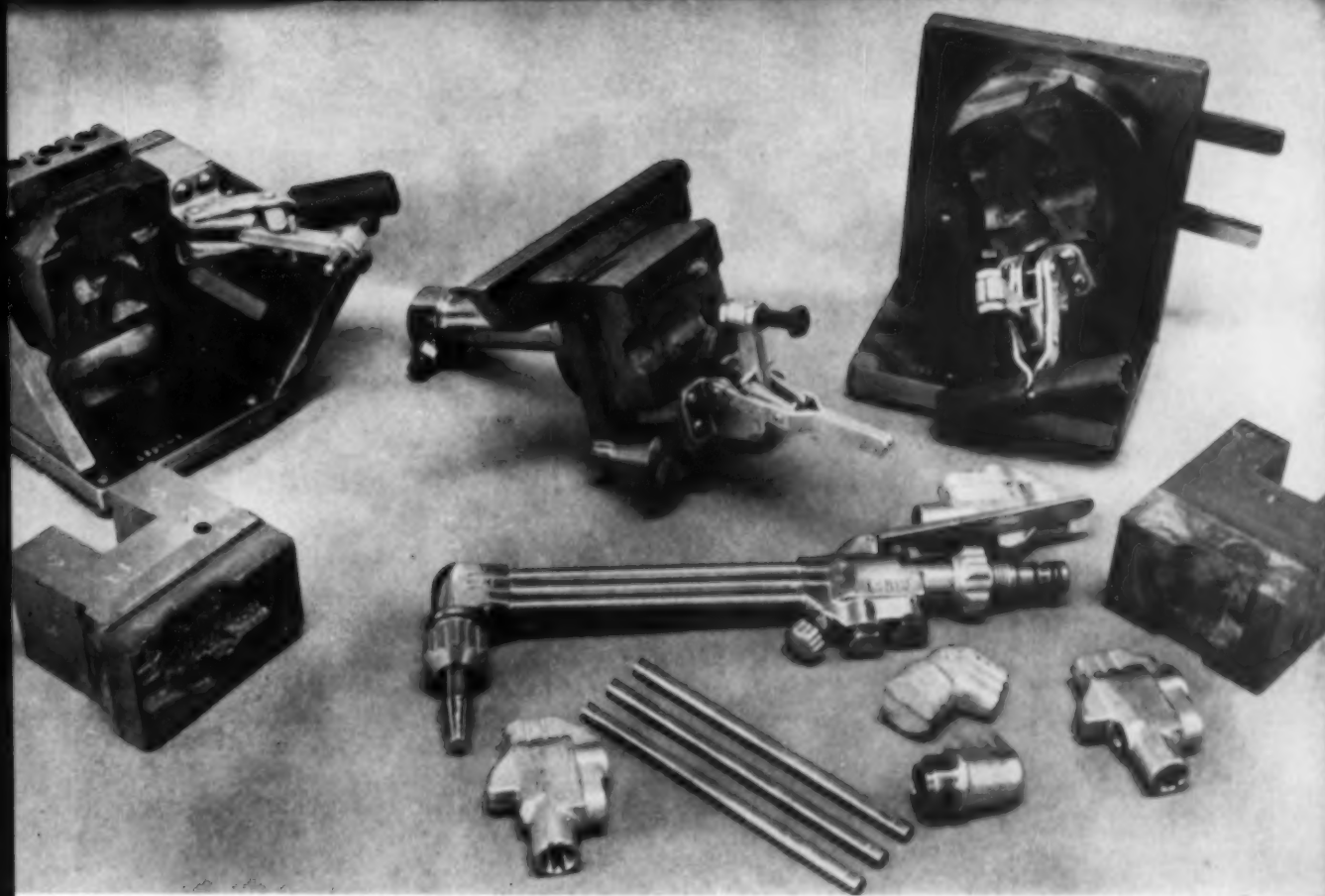
The Mark of



Specialized Research

TPA 104

Gates SUPER VULCO ROPE Drives



Cutting torch and component parts made by Smith Welding Equipment Corp., Minneapolis, Minn., are shown with some of the plastic tools used in their manufacture.

New tools made overnight with epoxy resins

Short production runs, frequent design improvements, and tight production schedules can benefit from tooling with compounds based on BAKELITE Epoxy Resins. Examples range from jigs, fixtures and chucking jaws for making the small precision parts shown here, to giant checking fixtures and Keller models used in automobile and aircraft manufacture.

These tooling compounds based on BAKELITE Brand Epoxy Resins are relatively easy to handle, and they harden at room temperature. The liquid resin is mixed with its liquid hardener and poured into place. Since curing shrinkage is negligible, the resulting tools are extremely accurate. They can be machined for further precision.

These properties mean that tools of

any size can be produced with speed and economy. The resin can cure overnight. You can have low-cost tools for many operations for which conventional tooling would be expensive. Write to Dept. 8M-172 for free copy of our booklet, "Why Plastic Tooling."



Pouring tooling compound into mold to form chuck jaws. Lining up and pouring takes about half an hour. Compound hardens overnight. These epoxy compounds are produced by **Roxolin, Inc.**, Los Angeles 45, Calif.



BAKELITE COMPANY, A Division of Union Carbide and Carbon Corporation **UCC** 30 East 42nd Street, New York 17, N. Y.
In Canada: Bakelite Company, Division of Union Carbide Canada Limited, Belleville, Ontario

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

CYLINDER TUBING

... "mirror-finished" by Standard

Standard "mirror-finished" cylinder tubing is full-finished to use without further sizing or finishing for such applications as *automobile shock absorbers, power steering and hydraulic pumps*. When it comes to punishment, it can really take it. Every inch of this rugged tubing measures up to exacting specifications in cylinder finish . . . in ID tolerances as close as .001" . . . in extreme uniformity of wall thickness and concentricity . . . in internal pressure resistance, *tested to shocks up to 9000 p.s.i.* Cylinder sizes to 3" OD x .165" wall. For full information on Standard's complete range of products, plant facilities and engineering assistance send for *free* folder below.

- Welded Stainless Tubing and Pipe.
- Boiler and Heat Exchanger.
- Welded Carbon Steel mechanical.
- Exclusive rigidized pattern.
- Special Shapes



Shock absorber with metal-to-metal plunger in cylinder tube held to .001" ID tolerance. "Mirror-finish", concentricity and precision tolerance makes Standard cylinder-grade tubing usable *as is* for hydraulic and other cylinders.



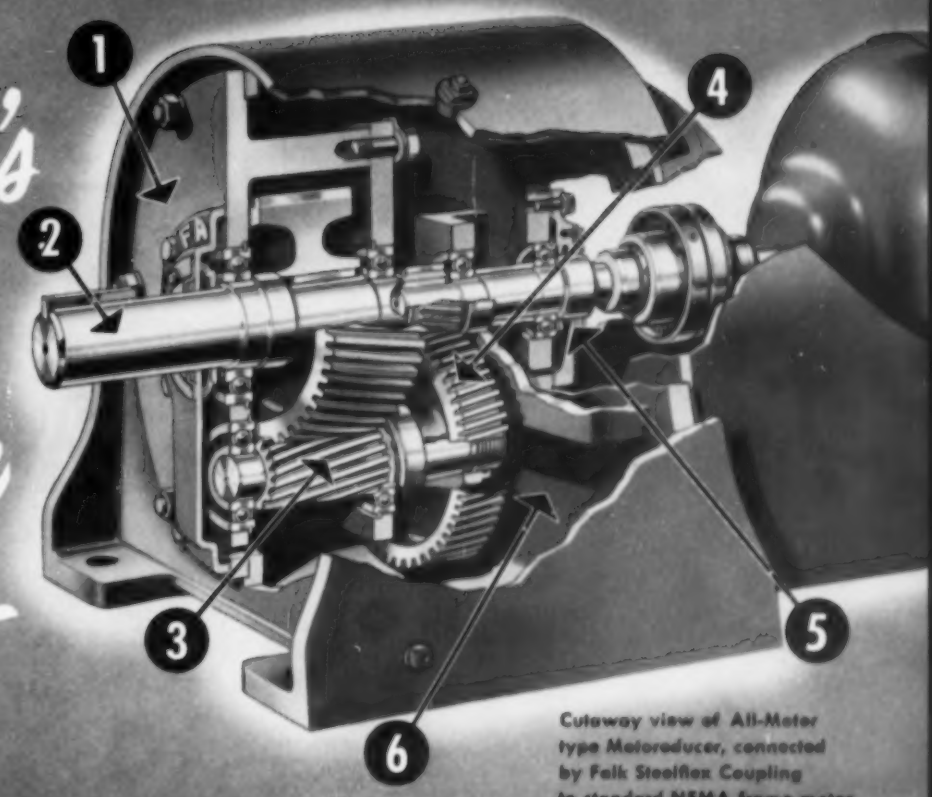
Free 8-page folder on all Standard products. Write to address below.

STANDARD

THE STANDARD TUBE COMPANY
24400 PLYMOUTH ROAD • DETROIT 39, MICHIGAN

Welded stainless tubing and pipe • Welded carbon steel mechanical • Boiler and Heat Exchanger
• Exclusive rigidized patterns • Special Shapes • Steel Tubing—Sizes: 1/8" OD to 5 1/2" OD
— .028 to .260 wall • Stainless—Sizes: 1/4" OD to 4" OD— .020 to .154 wall.

*Here's
the
inside
story—*



Cutaway view of All-Motor type Motoreducer, connected by Falk Steelflex Coupling to standard NEMA frame motor

WHY Falk Motoreducers give better service—have longer life

Here is the "inside story" behind the all-steel All-Motor type FALK Motoreducer's universal reputation as a gear drive unmatched in quality, efficiency, dependability, ease of maintenance and long life. These "in-built" factors are—

- 1 ALL-STEEL HOUSINGS.** Rugged, strong, rigid...all parts are manufactured from heavy steel plate, formed and welded in the Falk Weld Shop.
- 2 LARGE OVERHUNG LOAD CAPACITY.** Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum applied loads.
- 3 PRECISION GEARING.** Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion. Quiet, crown-shaved pinions.
- 4 EXTRA-CAPACITY GEARING.** Special extra-capacity gear-tooth form with larger contact area gives greater strength, higher load-carrying capacity.
- 5 SEALED HOUSINGS.** Splashproof, dust-proof, oil-tight construction. Dual closures and one-way vents keep oil in, dust and moisture out.
- 6 POSITIVE LUBRICATION.** Large sump capacity...oil-tight construction assures clean lubricant...revolving elements lubricated by direct dip.

When you buy or specify the All-Motor type FALK Motoreducer, you get all these—plus the tremendous advantage of full interchangeability of motors. Switch motors as desired—use any make, style or type of standard foot-mounted motor within the unit's AGMA rating—with a minimum of difficulty or "down time."

Available in sizes up to 75 hp—with or without motor—from convenient factory, field or distributor stocks, from coast to coast. **Write for Bulletin 3100.**



60,000 HOURS WITHOUT A FAILURE!

Sixty thousand hours is a lot of hours—but the FALK Motoreducer in the unretouched photo above has served that long without failure or need of repair.

This 3 hp unit is one of over 60 FALK Motoreducers in daily service in an Eastern plant of a large milling company, whose president says, in part:

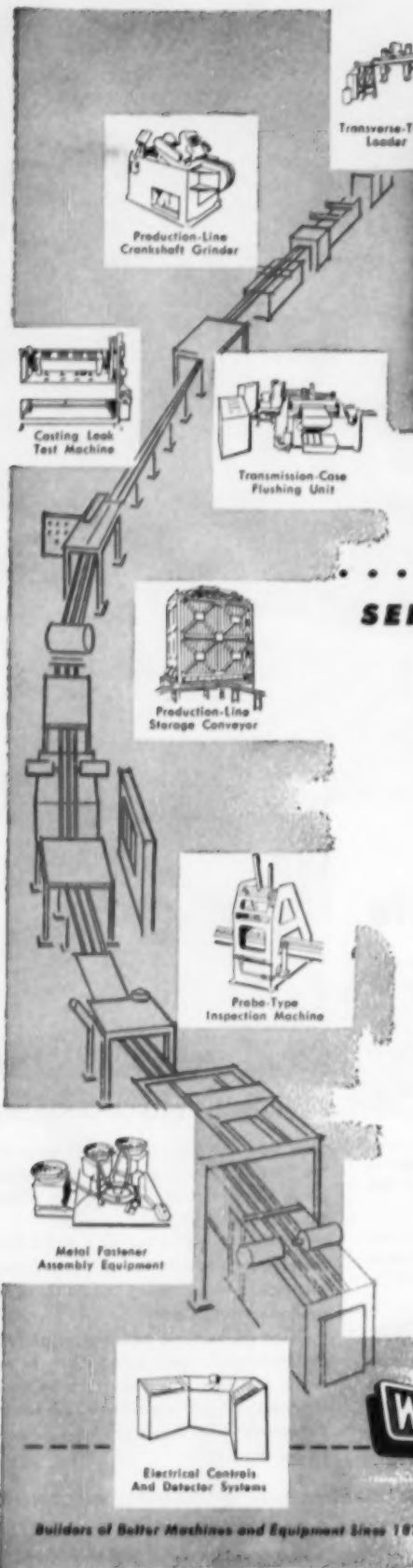
"One of the main advantages of FALK Motoreducers is their adaptability to any motor. Reducers and motors can be easily interchanged...Our service records confirm the wisdom of our choice of FALK equipment as our standard."

FALK

...a good name in industry

THE FALK CORPORATION, MILWAUKEE, WISCONSIN
MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining



For a practical solution to your automation problems . . .

CALL ON W. F. & JOHN BARNES . . . SPECIAL TWO-FOLD COORDINATED SERVICE SOLVES PROBLEMS QUICKLY

More and more production executives than ever before are today turning to Barnes for help in designing and building specialized automation equipment. With 80 years of practical machine building experience, Barnes have been called upon to design and build hundreds of different types of automatic handling and special processing equipment as well as special high production machine tools. Now, to better serve demands and help you solve automation problems quickly, Barnes offers a two-fold coordinated service:

COMPLETE PRODUCTION-LINE ENGINEERING

1

If you are planning new production-line methods for either automatic or semi-automatic operations, an experienced engineering staff is available to work with you. The detailed plans and proposals submitted for your consideration can be depended upon to provide you with the latest in automation engineering and the very best of proven mechanical, hydraulic, and electrical actuation. Ask for a free survey of your problems early in your planning program.

DESIGNING & BUILDING SPECIALIZED UNITS

2

Designing and building specialized, individual units to suit your specific needs is a separate, additional service. Where required, electrical, mechanical, hydraulic, fixture, and tool engineers work together as a team. All efforts are closely coordinated with complete manufacturing facilities to save you time and eliminate divided responsibility. As illustrated, this service covers hundreds of different types of automatic processing and work-handling units that are today profitably serving a wide range of industrial needs.

ANALYSIS OF METHODS — Call on Barnes engineers today for a practical solution to your automation problems. Or, ask for an analysis without obligation.

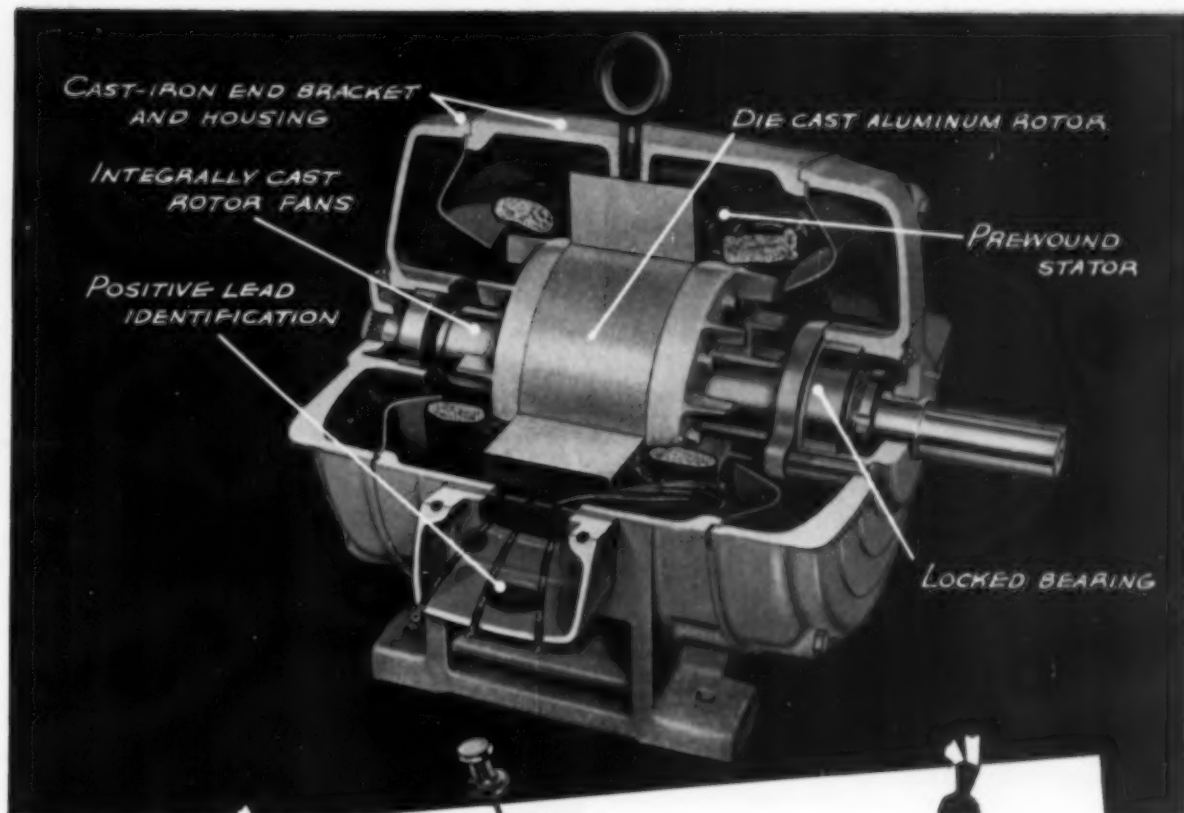


AUTOMATION SECTION

432 S. WATER ST. • ROCKFORD, ILLINOIS

SPECIAL MULTIPLE SPINDLE MACHINE TOOLS • SPECIAL PROCESS EQUIPMENT • SPECIAL ELECTRICAL CONTROLS

Builders of Better Machines and Equipment Since 1872



Are you getting all these extras in the motors you buy?

Louis Allis gives them to you, because they build their standard motors with special care

For years, Louis Allis has specialized in special motors for many of industry's toughest drive problems. Such installations call for extreme care in both motor design and manufacture—care that has become a habit with us. That's why we build our standard motors with special care.

What does this mean to you? It means that you get a motor with extra features—a motor that runs better, lasts longer. Here are a few of the extra reasons why:

- New exclusive phenolic impregnating varnish provides high thermal and

chemical resistance. It remains resilient and resists aging for longer motor life.

- Locked bearings, inner race to shaft, outer race to end bracket, reduce end play and increase bearing life.

- Increased protection not only for the motor, but also for operating personnel. Double end ventilation permits maximum end bracket enclosure—prevents foreign matter from entering motor.

- Quiet operation obtained by careful design and test. Close manufacturing tolerances assure perfect alignment and minimum electrical noise.

There are many other features such as cast iron construction, positive lead identification, split conduit box—but our new bulletin No. 1700 describes all the many extras you get in a Louis Allis standard motor. Write for your copy.



A complete line of standard rated motors in frames 182 through 326U now in stock. Special rated motors are available on short delivery.

LA-108



THE LOUIS ALLIS CO.
MILWAUKEE 7, WISCONSIN



.....

BETTER PROTECTION FOR OIL FILM BEARINGS

.....

To assure highest operating efficiency, bearings of back-up rolls must get maximum protection. With *Texaco Regal Oil* in roll stand circulating systems, that protection is assured. *Texaco Regal Oil* keeps them clean for an uninterrupted flow of lubricant. This means smoother operation, an increased production rate, reduced maintenance costs.

Texaco Regal Oil is made to order for steel mill service. It has outstanding resistance to oxidation,

emulsification and sludging—separates quickly from water. Even under the heaviest loads, it assures normal bearing temperatures.

For the most effective lubrication of enclosed reduction gears, use *Texaco Meropa Lubricant*. It resists oxidation, thickening and foaming—remains stable under extreme pressures. Thus, gear life is prolonged, operation is smoother and more dependable.

Specialized Texaco Lubricants can help you keep production up, costs down. Consult a Texaco Lubrication Engineer for complete details. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Lubricants, Fuels and
Lubrication Engineering Service

Metalworking Outlook

Scrap Prices Zoom

Steelmaking scrap prices shot up as much as \$13 a gross ton last week in some steelmaking centers. While there are a number of reasons for the surge (see STEEL, July 30, p. 135), they can be summed up as: 1. Expected strong demand. 2. Anticipated tight supply. 3. Inflationary results of the new steel labor contract. No. 1 heavy melting steel scrap reached \$56-\$57 in Cleveland, an \$11 rise over the preceding week. At Youngstown, it was \$59-\$60, up \$10, and at Pittsburgh it was \$55-\$56, up \$9. Electric furnace grades brought as much as \$63-\$64 in the Youngstown district, a \$13 jump. Last week also saw the highest price ever paid in Detroit for No. 1 bundles—more than \$60, and prices were expected to go higher.

Price Hikes Coming

Look for sharp increases in metalworking prices over the coming year. Though profits are running at high levels (see page 82), they are in for an immediate squeeze from higher steel prices and labor costs. How big will the increase be? After a steel price hike of only \$4.66 in 1952, the wholesale price index jumped 4.3 points in electrical machinery, and 4 points in construction machinery within the year. Some increases are already showing up. Frigidaire has increased washer and dryer prices on its 1957 models from 4.5 to 12.5 per cent. GE announces a 4 to 5 per cent increase on dishwashers and disposers. One steel company has upped steel drum prices 5 per cent.

Trouble in Aluminum

As predicted (STEEL, July 23, p. 38), the steel settlement meant trouble to aluminum. Last Tuesday, the United Steelworkers of America, which represents some 18,000 employees of Aluminum Co. of America, called a strike against Alcoa and Reynolds Metals Co., claiming that their offer did not match that won from steel producers. Alcoa said its offer of a 45.5-cent package was equivalent in value, pointing out that fringe distributions vary from the steel package because part of steel's went for premium Sunday pay, while the aluminum industry has paid this premium since World War II. The last strike in aluminum lasted from Oct. 17 to Dec. 7, 1949.

Money Shortage Hurts

Tight money is restricting the sales of some branches of metalworking. Witness: Some small truckers are finding it tough to finance trailer purchases, so Fruehauf Trailer Co. has revised its sales forecast downward to \$340 million this year instead of \$400 million.

Aircraft Union Ups Goals

The weight of the steel settlement will be felt for a long time in other labor negotiations. International Association of Machinists, for example,

Metalworking Outlook

representing employees in 188 aircraft and guided missile plants, already is talking about upping its wage demands when present contracts expire in 1958. More immediate trouble may be ahead in soft coal. John L. Lewis is preparing contract demands now. Negotiations will be opened shortly.

More Pay for Labor Experts

Metalworking's concern with labor problems is reflected in higher wages being paid to industrial relations and personnel men. Since 1948, the average salary of top personnel men is up 40 per cent, shows a survey by American Management Association, New York. This year, the typical labor trouble shooter makes \$9520, compared with \$9393 last year and \$8631 in 1954. Almost half the top men get a cash bonus. The average company employs one personnel man for every 131 workers.

New Push for Nickel

In addition to fast tax write-offs and market purchase contracts already authorized, Washington plans further financial concessions to speed up the nickel program. Covered will be "unusual development costs." The new move will be of most benefit to larger operations, where it can be proved that the effort will pay off. Most of the additional metal is destined for stockpile.

Fiscal '57 Navy Program Set

This year the Navy will start work on a sixth Forrestal-type aircraft carrier, its first nuclear-powered surface ship and two more atomic submarines. Bethlehem Steel's Shipbuilding Division will build the atomic surface ship, a guided missile cruiser, at Quincy, Mass. Other items in the fiscal 1957 program: Two guided missile frigates, three guided missile light cruisers to be converted from existing vessels, an amphibious assault ship and an attack aircraft carrier.

Exports Boost Canada's GNP

There's no leveling off in the Canadian economy. In the first quarter of 1956, Canada's gross national product hit a record annual rate of \$28.3 billion (Canadian dollars) on a seasonally adjusted basis. That's 3 per cent better than the figure for the last quarter of 1955, and 6 per cent better than 1955's mark. The boom continues to come from foreign demand for Canadian products: May exports set a new monthly record.

Straws in the Wind

Jessop Steel Co. may buy Green River Steel Corp. . . . A \$6-million billet mill will be installed at Pittsburgh Steel Co.'s Monessen, Pa., works . . . M. W. Kellogg Co. dropped its price of KEL-F fluorocarbon plastic molding resins to \$6 a pound . . . Towmotor Corp. installed a continuous process for truck assembly and electronic data processing equipment . . . Ingalls Shipbuilding Corp. says its Decatur, Ala., yard was shut down, but not to conserve steel for its Pascagoula, Miss., facilities as reported (STEEL, July 16, p. 81).

pre-planned



In estimating production costs, one of the items a metal fabricator takes into account is the cost of steel. As important as this is, it is sometimes good economics to pay more for steel, but pay less in the end for the fabricated part. The cost of down time on expensive forming equipment, the cost of idle labor, the cost of re-processing defective parts, may well exceed the cost of the extras built into restricted specification steel, which will eliminate these unplanned-for costs.

CMP restricted specification cold rolled strip steel can be pre-planned to minimize production delays and produce for you the production cost you need. We will welcome the opportunity to explore with you the cost-saving potentials in your manufacturing processes which may be available to you by use of **CMP** restricted specification cold rolled strip steel.

CMP

WHERE YOU CAN GET
SPECIFIC SPECS
FOR
SPECIFIC JOBS

LOW CARBON, ELECTRO ZINC COATED,
HIGH CARBON, TEMPERED SPRING STEEL,
STAINLESS AND ALLOY

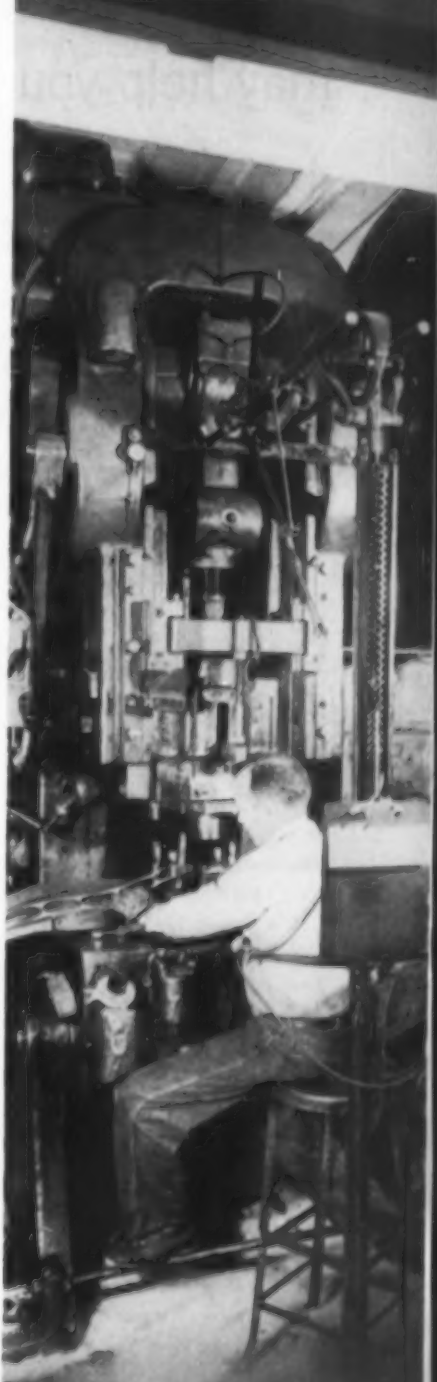
THE COLD METAL PRODUCTS CO.

GENERAL OFFICES: YOUNGSTOWN, OHIO
PLANTS: YOUNGSTOWN, OHIO & INDIANAPOLIS, IND.
SALES OFFICES: New York • Cleveland • Chicago
Indianapolis • Detroit • Los Angeles • San Francisco



CMP
RESTRICTED SPECIFICATION
COLD ROLLED STRIP STEEL
boosts production, stops slow-downs, reduces die costs, meets feed and speed requirements of automatic equipment.

results



CMP
STRIP PROVIDES
the precision dimensional and physical qualities that solve many fabrication, cost and performance problems.

How Armco 17-4 PH Stainless may help you eliminate 4 costly shop operations

Steps in Production of Specimen Parts With Same Tensile Properties

Type 416 Stainless Steel

1. Rough machining
2. High temperature heat treatment—about 1800 F
3. Stress relieving
4. Pickle
5. Straightening
6. Finish machining

Armco 17-4 PH Stainless Steel

1. Finish machining
2. Low temperature heat treatment—850 to 900 F
- 2A. Light pickle (needed only when appearance is vital)

If you machine stainless parts that must have high strength and hardness, here's a special Armco Stainless Steel that can cut as many as four operations from your shop practice.

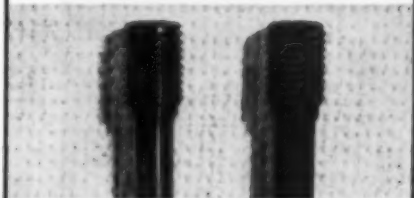
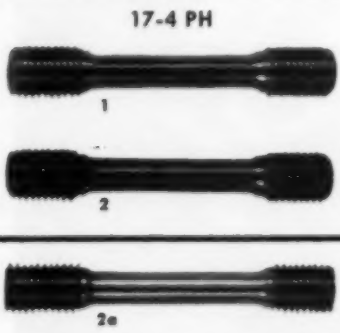
It's Armco 17-4 PH, a special stainless steel that can be finish-machined and then hardened fully with a *low-temperature* heat treatment. *There's no scaling or distortion.* Parts can be completely finished in just two operations.

In the production of these stainless parts, for example, a switch from Type 416 stainless to Armco 17-4 PH eliminated 4 steps—stress relieving, pickling, straightening, and a final machining operation.

But that's not the whole story. Not only does the finished 17-4 PH part have the same tensile properties as the Type 416 stainless part . . . *it has better corrosion resistance.*

TWO PH GRADES

Armco 17-4 PH is available in billets, bars and wire. Its companion precipitation hardening grade, 17-7 PH, is produced in sheets, strip, plates, bars and wire. For full information about these special Armco Stainless Steels, just write us at the address below.



After normal 1800 F heat treatment, Type 416 stainless steel threads (right) are scaled and distorted. In contrast, threads of the Armco 17-4 PH Stainless part (left) are sharp and clean after a low-temperature (900 F) heat treatment.

ARMCO STEEL CORPORATION

1496 CURTIS STREET, MIDDLETOWN, OHIO



SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION



August 6, 1956

A Congress for Ike!

Thirteen weeks from tomorrow, American voters will go to the polls to elect a President, 435 representatives and 34 senators.

The President's personal popularity, ability and present state of health make his election on Nov. 6 almost a certainty. Anything but certain is the election of the 218 representatives and 49 senators needed to give him a working majority in the 85th Congress when it convenes on Jan. 3.

In the 1952 election, 61.7 million voters turned out to sweep President Eisenhower into office and give him a majority in the House and Senate. In 1954, he lost that majority when only 41 million out of 102 million people eligible to vote appeared at the polls.

The record of the 84th Congress is evidence of what can happen when these two branches of government are not working hand in hand:

On the farm subsidy issue, the pressure was on for a return to the old price supports of 90 per cent of parity.

Amendments to the Taft-Hartley Act were turned down.

A proposal for realistic postal rates died in the Senate.

A bill for protecting civil rights did not pass.

Financing of the \$33.5 billion road program was switched from bonds to taxes on gasoline and tires.

The Territory of Hawaii did not make statehood.

The vital \$2.1 billion military construction bill passed at the final session embarrassed the President with a clause requiring House and Senate committee approval of certain contracts—an invasion of the executive function.

Social Security benefits were liberalized with higher costs to both employee and employer.

Nothing was done about the Hoover report.

The \$4.9 billion foreign aid bill was chopped by \$1 billion.

Defense appropriations were raised by an unwanted \$800 million for the Air Force.

The upcoming election will decide whether this nation will continue to have a divided government with its executive and legislative branches controlled by different political parties.

Preliminaries get under way next week in Chicago when Averell Harriman battles it out with Adlai Stevenson for the Democratic nomination (now that Estes Kefauver is out of the running). One week later in San Francisco, President Eisenhower is certain to get the Republican nomination—perhaps by acclamation.

If you agree that President Eisenhower is the man for the job, it follows that he is entitled to a Congress that will work with him.

It means registering and voting, reminding your associates to do the same.

Irwin H. Such
EDITOR-IN-CHIEF



NOTE ON PRIORITY RATINGS—When your stainless requirements are covered by a rating, please be sure to extend it on your order to Ryerson. You will be helping yourself by helping to assure future availability of nickel-bearing stainless from Ryerson stocks. Shown here: One Ryerson plant's stainless sheet section.

for **STAINLESS**, call **Ryerson...**



Ryerson stainless bar stocks include free-cutting types, aircraft quality bars—many others.



Any shape can be accurately flame cut from stainless plate with special Ryerson plate burning equipment.



More than 300 miles of stainless pipe and tubing are on hand at Ryerson. Size range: 1/8" through 8 1/2" O.D.



Felt pads on Ryerson shears protect the beautiful finish and flatness of Allegheny stainless sheets during cutting.

here's why: your call to Ryerson connects you with the nation's largest stocks of stainless steel—2,351 sizes, shapes, types and finishes of time-tested Allegheny stainless—carried in tonnages that assure prompt shipment of your warehouse requirements.

... you get the benefit of Ryerson's long experience with stainless—30 years of it,

dating from the days when Ryerson pioneered as the first supplier of stainless from stock. All we've learned in that time is at your command when you want help on problems of stainless application or fabrication.

RYERSON STEEL

PRINCIPAL PRODUCTS: CARBON, ALLOY AND STAINLESS STEELS • MACHINERY & TOOLS • INDUSTRIAL PLASTICS, ETC.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Pattern for Peace:

Here Are Terms of Three-Year Contract for Steelworkers

• **Wages**—7.5 cent hourly increase, plus a 0.3 cent increase in increment between job classes, effective at date of contract signing. Job Class 1 is combined with Job Class 2, and all workers formerly in Job Class 1 receive 13.5 cent wage increase.

Effective July 1, 1957, hourly increase of 7 cents, plus 0.2 cent increase in increment between job classes, or equivalent.

Effective July 1, 1958, hourly increase of 7 cents, plus 0.2 cent increase in increment between job classes, or equivalent.

• **Cost of Living Adjustment**—Semiannual adjustment in wages to reflect increases in the Consumer Price Index, if index moves above 116.5. Adjustment will be 1 cent an hour added to straight time earnings for each 0.4 or 0.5 point change in index based on table of sequences.

• **Sunday Premium Pay**—10 per cent premium for Sunday work from Sept. 1, 1956, to June 30, 1957, 20 per cent premium for Sunday work from July 1, 1957, to June 30, 1958, 25 per cent premium for Sunday work from July 1, 1958, to June 30, 1959.

• **Holiday Overtime Pay**—Effective July 1, 1957, double time and one-tenth will be paid for holidays worked. After July 1, 1958, the rate for holidays worked will become double time and one-quarter.

• **Jury Pay**—Employee will receive difference between eight times his straight hourly earnings and payment he receives for jury service.

• **SUB**—A plan for Supplementary Unemployment Benefits shall be negotiated. Company contributions will be 3 cents an hour, plus 2 cents an hour as a contingent liability when fund is less than 100 per cent of the amount required by the plan. Benefits shall apply to employees with two years of service.

Payments may extend for 52 weeks, will be equal (including state unemployment compensation) to 65 per cent of pay.

• **Insurance**—New agreement to be negotiated. In-

urance plan will cost 3 cents an hour more than present plan, with companies and workers sharing cost equally. Any future increase in cost of agreed benefits will be shared equally by workers and companies.

• **Holiday**—Good Friday added to list of paid holidays.

• **Pensions**—Effective Nov. 1, 1957, minimum benefits raised to \$2.40 per month for each year of service before Nov. 1, 1957, and to \$2.50 per month for each year of service after Nov. 1, 1957, up to a maximum of 30 years.

Companies informed the union they voluntarily were increasing benefits to retired workers.

• **Vacations**—Effective Jan. 1, 1958, an additional half week of vacation pay for employees with 3 to 5 years of service, for 10 to 15 years of service, and for more than 25 years of service.

• **Shift Premiums**—Shift differentials will be increased from 6 cents to 8 cents for afternoon shifts, from 9 cents to 12 cents for night shifts, effective July 1, 1958.

• **Union Security**—Employees who are members of union must continue membership as condition of employment. New employees must join union after 30 days on job.

• **Costs**—Union estimates three-year gain for steelworkers at 45.6 cents an hour, or a total of \$1,332 million. First year gain is estimated at 20.3 cents an hour; second year, 12.2 cents; third year, 13.1 cents.

Companies estimate costs for three-year period will be up 52 to 55 cents an hour. First year costs will be up 20.7 cents, second and third years, about 16 cents an hour. Latter figures do not include additional cost of higher pension benefits, cost of living adjustments, possible increase in costs of new insurance benefits and probable other cost increases, not now calculable.

Peace and Prosperity—with Inflation

Three-year wage agreement brings sudden jolt in prices, but promises stability in years ahead. Steel buyers sharpen pencils to figure new costs and prices

PEACE, expansion and prosperity for steel over the next three years—but at the cost of a substantial amount of inflation.

That is how steel and metalworking executives analyze the new three-year, no-strike labor agreement between the United Steel-

workers of America and the basic steel producers.

Commanding most attention is the sharp increase in steel prices necessitated by the heavy wage boost.

Metalworking and steel executives agree that the increase gives

a fillip to inflation and that the higher steel prices soon must be reflected in the prices of components and end products.

Stability—On the plus side, steelmakers point out that the three-year contract with lower cost increases in 1957 and 1958 will encourage stability of steel prices over the next several years.

The longer contract is expected to improve productivity, which will partially offset wage increases

Pattern for Stability: Steel Wage Scales—1956, 1957, 1958

JOB CLASS	June 30, 1956	Date of Agreement 1956	July 1, 1957	July 1, 1958
0-1	\$1.685	\$1.82	\$1.89	\$1.96
2	1.745	1.82	1.89	1.96
3	1.805	1.883	1.955	2.027
4	1.865	1.946	2.02	2.094
5	1.925	2.009	2.085	2.161
6	1.985	2.072	2.15	2.228
7	2.045	2.135	2.215	2.295
8	2.105	2.198	2.28	2.362
9	2.165	2.261	2.345	2.429
10	2.225	2.32	2.41	2.496
11	2.285	2.387	2.475	2.563
12	2.345	2.45	2.54	2.630
13	2.405	2.513	2.605	2.697
14	2.465	2.576	2.67	2.764
15	2.525	2.639	2.735	2.831
16	2.585	2.702	2.80	2.898
17	2.645	2.765	2.865	2.965
18	2.705	2.828	2.93	3.032
19	2.765	2.891	2.995	3.099
20	2.825	2.954	3.06	3.166
21	2.885	3.017	3.125	3.233
22	2.945	3.08	3.19	3.300
23	3.005	3.143	3.255	3.367
24	3.065	3.206	3.32	3.434
25	3.125	3.269	3.385	3.501
26	3.185	3.332	3.45	3.568
27	3.245	3.395	3.515	3.635
28	3.305	3.458	3.58	3.702
29	3.365	3.521	3.645	3.769
30	3.425	3.584	3.71	3.836
31	3.485	3.647	3.775	3.903
32	3.545	3.71	3.84	3.97

scheduled for the next two years. The longer-term contract injects a note of confidence in future planning that has been lacking while the union and companies negotiated on an annual basis.

Losses—Costs of the strike, interrupting production for five weeks, were heavy. Tonnagewise the loss was 10 million tons of ingot. Dollarwise, the loss is estimated at \$1.4 billion in steel products not sold, in steelworkers' wages, and in wages of allied industries.

In all fairness, the above loss figures could be minimized by vacations which coincided with the strike.

Relatively few metalworking companies suffered hardship due to steel shortages. More companies will feel the pinch before finished steel products fill the pipelines to consumers.

Producers expect a high rate of operations will prevail through the remainder of 1956 and into 1957 as consumers attempt to rebuild their inventories.

Inflation Now

One reason for waiting until all wage agreements were signed before ordering production resumed was to enable the companies to prepare their new price lists to

reflect the higher costs.

Leading steelmakers figure that each cent of wage increase boosts steelmaking costs by 60 cents a ton, including direct wage costs and the costs of goods and services purchased. They figure that the 20 to 21 cents an hour added to labor costs in the new contract mean a \$12 to \$13 a ton increase in steelmaking costs.

Net profit per ton of ingot produced amounted to only \$9.51 in 1955, the industry's best profit year.

New price lists issued by the steel producers set metalworking executives figuring increases in their costs and examining their markets for the best time to pass along the increased costs.

Effect of the agreement will be a sharp jolt of inflation now and a promise of greater price stability over the next three years.

Union Gains Substantial

The United Steelworkers hail the agreement as the "greatest victory" ever achieved by the union. The settlement, says the union, not only represents the largest wage and fringe package ever negotiated, but also "achieves a historic breakthrough in the basic steel industry on week-end premium pay, a 52-week Supplemental Unemployment Benefit plan, and a union shop provision requiring all new employees to join the union."

Dimensions of the settlement refute charges from some quarters that the strike was a phony. The negotiations were tough, and the bargaining hard. Absent was much of the emotion and bitterness evident in earlier strikes. To labor relations people, the conduct of the negotiations suggests increasing maturity in labor negotiations.

Peace Treaty — Producers find

Strike's Cost

(in millions)

In steel product sales	\$1100
In steelworkers' wages	250
In other wages	50
Total	\$1400

satisfaction in the assurance of three years of labor peace. They point out that five strikes in 11 years have cost the country 55 million tons of steel production, an average of 5 million tons annually. Unbroken industrial peace, they believe, will have the effect of increasing the working capacity of the industry by an average of close to 5 million tons a year.

The industry is in a position to plan ahead on its expansion program which is designed to add 15 million tons of new capacity during the life of the contract, while utilizing present capacity all the time.

The long-term contract also will have advantages to steelworkers, who can plan their personal spending without fear of work and income interruptions, and to steel mill customers who can plan on a steady flow of steel supplies and, after the jolt of current price increases, on relative price stability.

Getting Back to Work

Within ten days to two weeks, steel mills will be able to push their operating rate within 10 per cent of prestrike levels.

But it will take longer for full production to be reached. Last year, it was mid-October before the industry could throw off all the effects of the one-day strike in early July. In 1952, production in the first week following the 53-day strike was 42 per cent of capacity. In the second week, it was up to almost 90 per cent. It took another five weeks to make up the remaining 10 per cent.

Timetable — U. S. Steel Corp., Pittsburgh, anticipates that its production will be zero on the day following the resumption of work in the mills, 18 per cent of capacity the second day and 37 per cent of capacity the third day.

Explains a spokesman for Jones & Laughlin Steel Corp., Pittsburgh: "Open hearth furnaces are cold. It takes three or four days to start producing ingots again after the strike, since warm-up must be slow to prevent damage. It will also require three days for the blast furnaces to produce their first iron." Adds Wheeling Steel Corp., Wheeling, W. Va.: "Maintenance and repair work must be handled before you can start up. Mills were operating near capacity during the

second quarter and need repairs. This may take a week. It will be another week before we can produce quality steel."

Rebuilding — Other producers agree. Says a spokesman for Pittsburgh Steel Corp., Pittsburgh: "During the first few days of open-hearth operations, heats are low in carbon, high in manganese. We can't use this quality steel for products like oil well tubing, for example. It will be ten days after the men go back to work before we can make any shipments of it."

Adds another steel company executive: "We'll have to fill up our own pipelines before we begin to service customers. Before the strike, we shipped out all possible steel. It will take us two weeks before we are making steel that we can finish into products like wire."

E. G. Grace, Bethlehem chairman, says his company will be producing steel at 100 per cent of capacity within ten days.

Ore: Race with Weather

WHEN the steel strike started, ore shipments were about 3.2 million gross tons ahead of last year's. A month later, at the dangling end of the strike, shipments had dropped more than 7 million tons behind the 1955 pace.

Total loss in the ore movement

will be much greater. Ore shipments continued after the strike started. In the week ended July 9, more than 1 million gross tons were sent down the lakes. Now, after the end of the strike, pipelines must be filled. Freight cars must be loaded and sent to the docks before shipments can resume on a high level.

Donald C. Potts, president of U. S. Steel's Pittsburgh Steamship Division, estimates the strike prevented the movement of 15 million tons of ore.

Getting Ready—The week after the steel agreement, Pickands Mather & Co., Cleveland, started to put its boats back in commission.

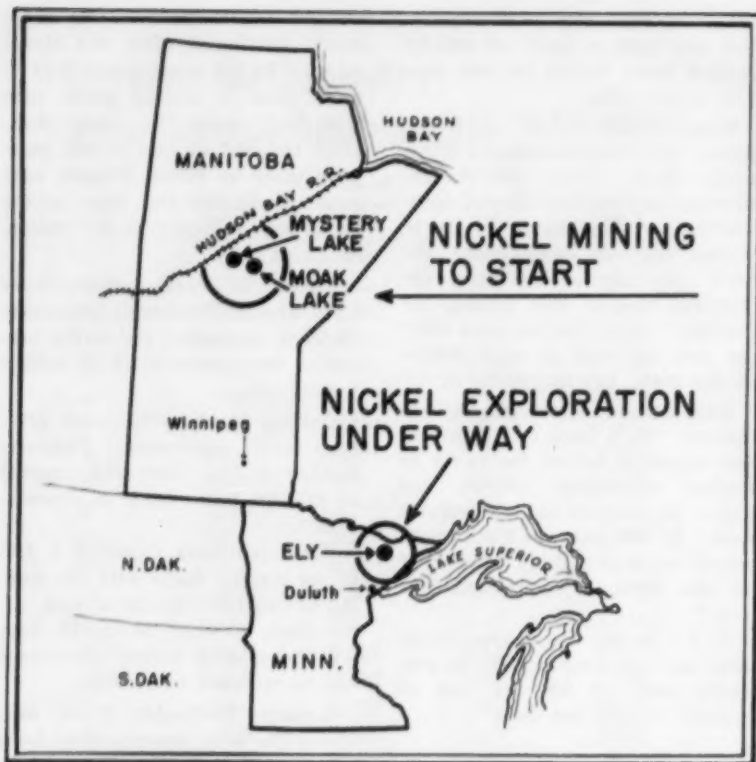
Fleet operators expected a jam at ore loading docks with the signing of contracts by the miners. After that, another 10 to 15 days will be needed before operations can be returned to normal.

Enough Ore?—Mr. Potts estimates the total movement of Lake Superior ore at 78 million to 80 million tons. He says: "If weather permits, we will load ore in December."

Mr. Potts predicts ore supplies will be tight by Apr. 1 next year. Some grades may be short. He thinks all furnaces can get by if the season gets off to a good start in April.



Ore boats start up as the steel strike ends



New Nickel Mines To Open

Inco will start preliminary operations by the end of October in the Mystery-Moak lakes region of Manitoba, Canada. Company also is exploring Minnesota

LOOK for International Nickel Co. of Canada Ltd. to start preliminary nickel mining operations in the Mystery-Moak lakes region of Manitoba, Canada, by the end of October.

Please-do-not-quote sources in industry explain that while it has not been proved fully that there is enough workable tonnage of commercial grade nickel in the region to support a mine, it is the most promising new area known.

Background—Inco first became interested about ten years ago. A small outcropping of nickel ore was found at Mystery lake and a somewhat richer deposit was discovered at Moak lake.

The ore contains small amounts of copper, but this represents a refining nuisance in nickel production, not a new source of copper

for the commercial market. It is reported that the ore also contains small quantities of platinum, palladium, gold and silver.

Power—While exploration continues at the 1100 and 1300 ft levels, discussions are being conducted with the provincial government to determine who would build the necessary power plant. There is no firm agreement, but it is felt that the plant would go ahead when mining activity is initiated. Located some 40 miles away from the main mine site, the power project would take four or five years to complete.

Peak expenditures would come in the third year. It is reported by high authorities that Inco's investigation of the many complex angles will go forward "intensively" during the next two months

in close co-operation with governmental officials in Manitoba.

Transportation—Top spokesman in industry informed STEEL that Inco has had preliminary talks with the Canadian National Railway about the construction of branch lines.

Composition of the Moak ore runs about 0.6 per cent nickel, with ledges of higher grade material. While one observer points out that the big question still remains whether there is enough high grade ore to sweeten the basic low grade deposit, others point out that you don't contact railroads and enter discussions about power with a provincial government unless things are coming to a head.

It is also known that Harry S. Wingate, Inco president, visited the Mystery-Moak lake region recently and told local newsmen that this is by far the most promising area. Inco is conducting other explorations in Saskatchewan, Australia and Venezuela.

Intrigue?—Some U. S. senators seem to be finding out for the first time that International Nickel Co., the American subsidiary of the parent Canadian firm, is exploring for nickel and doing diamond drilling in the 3-million-acre Lake Superior National Forest (Minnesota). This program has been under way since 1952.

The American side of Inco generally restricts itself to sales, watching over the Huntington, W. Va., fabricating works and housing the executive offices. But the U. S. subsidiary does have an exploration group, and part of the men from this department have been in Minnesota. Results to date: They have taken out only an exploration license. It is reported that it would be possible for them to get a 50-year lease on the property. Terms for such a possible agreement already have been passed upon by the U. S. and Inco, but there is no indication that anything will be done in the near future.

Crux: It will take several years to bring in nickel ore production, but the development of the Mystery-Moak ore bodies will be a partial answer to where future nickel supplies are coming from.

Fractional Motor Sales

1966	\$ 1 billion
1961	\$750 million
1956	\$555 million
1955	\$525 million
1954	\$435 million
1953	\$515 million
1952	\$393 million

Estimated by STEEL



Jack & Heintz Inc.

Trend: More Small Motors

This year, fractional horsepower sales will be about 50 million units. By 1960, they will be 65 million. In 1965, they will hit 90 million, predicts GM's Delco Division

THE EASY WAY of American living is creating a \$1-billion industry. A host of household items uses fractional horsepower motors—refrigerators, air conditioners, fans, washing machines, vacuum cleaners. This year, sales will be around \$555 million. In ten years, production may double, says one of the industry's leaders. More conservative are the predictions shown in the table above.

The average homeowner, estimates Westinghouse Electric Corp., Pittsburgh, has 15 to 20 fractional horsepower motors under his roof. Increasing the mechanization of the home are expanding uses of barbecues, broilers, dishwashers, oil burners,

clothes dryers, hair dryers and garbage disposers.

Major Users—Delco Products Division, General Motors Corp., Dayton, O., says the major users are appliance manufacturers. Other substantial applications: Farm machinery, machine tools, business machines, aircraft and typewriters.

The biggest growth potential, says P. B. Best, sales manager, O. A. Sutton Corp. Inc., Wichita, Kans., is in the air conditioning industry.

Automation is increasing the demand for motors with low inertia rotors. Another new market is in the textile field. Motors are needed to spin synthetic fibers.

A Trend—Submersible motors, introduced in 1950, are making big gains. In 1953, of 702,051 domestic water systems 34,785 were powered by submersible pumps. Last year, 51,583 of 796,332 water systems were of the submersible type. This year, these pumps are selling at better than a 60,000-a-year clip. (About 70 per cent of these motors are under 1 hp.)

Lawrence L. Bechler, manager of commercial motor sales, Jack & Heintz Inc., Cleveland, gives 250,000 as a conservative estimate of submersible sales in 1960. He predicts that by 1965, 75 to 80 per cent of all deep well systems will use these motors. Reason for the big increase: Submersible pumps meet the problem caused by falling water tables.

Sump and gasoline pumps are other uses for these units.

Changes—J. R. DeBacher, vice president, Speedway Mfg. Co. Division, Thor Power Tool Co., Chicago, predicts aluminum probably will be used more widely in small motors. Die-cast aluminum is re-

placing cast iron end frames where weight is a factor. Westinghouse looks for magnesium to get a share of aircraft and other uses where weight savings are needed.

Robbins & Myers Inc., Springfield, O., says die-cast aluminum has replaced copper almost entirely in rotor bars for fractional motors. The use of aluminum in field windings is considered more as a substitution than an improvement. If copper prices are stabilized, this trend will be halted.

Prices—About a year ago, prices were boosted about 4 per cent. Once again the pressure is upward. Leland Electric Co. Division, American Machine & Foundry Co., Dayton, O., raised prices 7½-per cent Aug. 1. Others will follow.

To Buy Newport

Acme Steel will broaden its operations with Newport's 708,000-ton ingot capacity

ACME STEEL Co., Chicago, is about to become an integrated steel producer. Subject to stockholders' approval, Acme has offered to buy Newport Steel Corp., Newport, Ky.

Merritt-Chapman & Scott Corp., New York, holder of 98.2 per cent of Newport's stock, has indicated that it will accept the offer at an August meeting.

Facilities—Newport has an annual rated ingot capacity of 708,000 tons from open hearth and electric furnaces, with blooming mills for producing hot and cold-rolled sheets, electricweld line pipe and specialties.

Acme Steel expects to barge some semifinished steel from Newport to its Riverdale, Ill., plant to supplement its supply of raw material.

Goals—More product diversification and greater operating flexibility will be Acme's gain from the transaction. The two firms have sales totaling \$170 million.

Acme reported first-half earnings of \$3.9 million, compared with \$3.4 million in 1955's first half. Second quarter profits were \$2 million.

Newport would be operated as a division of Acme and will continue to serve its present customers.

Earning Outlook Is Good

Metalworking's first half was spotty, but the picture will brighten with a good second half in autos. The steel industry set new records all the way around

WITH SOME major exceptions, metalworking had a near-record first half. The outlook for the second half is good, but must be tempered as the effects of the steel strike show up.

Blaw-Knox Co., Pittsburgh, both a major supplier and customer of the steel industry, is an example.

Anticipation—First-half earnings were \$3,557,972 on sales of \$78 million. In 1955's first half, Blaw-Knox earned \$968,740 on sales of \$48 million. "The first half benefited in some degree from customers' anticipation of higher prices and a steel strike," says W. Cordes Snyder Jr., president.

The firm's backlog of orders totaled \$140 million on June 30, compared with \$111 million at the end of 1955. Third-quarter operations will be "adversely affected by the steel strike," comments Mr. Snyder.

Transportation—Pullman-Standard Car Mfg. Co., Chicago, reports a backlog "sufficient to insure continuation of production well into 1957." Fairbanks, Morse & Co.'s president, Robert H. Morse Jr., predicts higher earnings in the second half than the first half's \$1.3 million.

Commercial aircraft sales by Cessna Aircraft Co., Wichita, Kans., in the first half exceeded sales for all of 1955. Research and development costs cut into the profits of Douglas Aircraft Co. Inc., but sales were up almost 5 per cent.

Record Highs—Both sales and earnings of Mack Trucks Inc. and White Motor Co. set records. Robert F. Black, chairman, White Motor, thinks sales of his firm will exceed \$200 million this year to set new yearly totals.

Dollar sales of General Motors Corp. in the first half were second best to only those of 1955's first half. Earnings were \$503 million, compared with \$661 million in 1955.

GM's defense sales continued to decline: From 8.5 to 4.5 per cent of total sales.

Chrysler Corp. reports its auto output declined 40 per cent during the first half.

Metals—Kennecott Copper Corp. had earnings of \$89 million in the first half, compared with \$65 million in 1955's first half. Revere Copper & Brass Inc. is expecting higher inventories in the automotive industry in the fourth quarter to boost its sales. Earnings in the first half were down to \$5 million from \$6.2 million in the first half last year.

Earnings of National Distillers Products Corp. were up 48 per cent from the same period in 1955. Demand for the products of Climax Molybdenum Co. was exceptionally strong in the first half, says Arthur H. Bunker, president, but production problems forced sales and earnings down.

National Lead Co.'s earnings in the first half were the highest for any six-month period in the company's history. Union Carbide & Carbon Corp. reports income up over 10 per cent.

Electrics—Ralph Cordiner, president, General Electric Co., thinks 1956's sales will run "substantially ahead" of 1955's: GE's sales and earnings in the first half were at record highs.

Westinghouse Electric Corp., on the way back after its five-month strike, reports a first-half loss of \$11.7 million, compared with earnings of \$29.4 million in 1955's first half. Sales of Westinghouse appliances in the second quarter were the highest in history, "despite the fact that the appliance industry generally is plagued by overproduction," notes Vice President John W. Craig, general manager, Electric Appliance Divisions.

Equipment—Stanley C. Allen, president, National Cash Register Co., reports six-month earnings

Steel's First-Half Earnings Rise

SELECTED STEELMAKERS	1956	1955
Alan Wood Steel Co.	\$ 1,287,000	\$ 892,000
Allegheny Ludlum Steel Corp.	9,090,579	6,415,653
Barium Steel Corp.	2,914,000	377,000*
Bethlehem Steel Corp.	95,262,014	82,319,324
Continental Steel Corp.	1,590,404	1,585,098
Detroit Steel Corp.	4,142,551	2,625,164
Granite City Steel Co.	7,532,822	5,457,603
Inland Steel Co.	28,960,481	23,419,852
Jones & Laughlin Steel Corp.	30,909,000	22,568,000
Lone Star Steel Co.	4,798,689	2,288,690
Lukens Steel Co.	3,542,133	849,290
McLouth Steel Corp.	5,017,631	2,920,071
National Steel Corp.	28,961,410	23,032,871
Pittsburgh Steel Co.	4,781,107	2,574,777
Rotary Electric Steel Co.	1,171,080	1,889,895
Sharon Steel Corp.	4,325,632	4,488,002
U. S. Steel Corp.	208,550,441	177,877,960

How Metalworking Firms Fared in First Half

SELECTED MANUFACTURERS	1956	1955
Allis-Chalmers Mfg. Co.	\$ 11,855,735	\$ 12,562,932
Aro Equipment Corp.	502,329	835,302
Babcock & Wilcox Co.	7,199,769	7,231,708
Bell Aircraft Corp.	3,240,798	3,183,978
Caterpillar Tractor Co.	26,234,963	15,446,995
Central Foundry Co.	513,105	609,151
Clark Equipment Co.	4,595,668	3,716,765
Container Corp. of America	9,732,000	8,039,000
Continental Can Co. Inc.	14,493,000	10,289,395
Diamond T Motor Car Co.	1,028,818	46,234*
Douglas Aircraft Co. Inc.	12,820,637	13,680,622
Douglas & Lomason Co.	5,776	424,130*
Eaton Mfg. Co.	7,459,750	7,397,402
Fairbanks, Morse & Co.	1,310,557	1,303,419
Ferro Corp.	1,300,936	1,273,049
Filtral Corp.	2,882,000	2,517,000
Firth Sterling Inc.	508,000	184,800
General Electric Co.	112,864,000	107,799,000
General Motors Corp.	503,471,823	660,961,942
Gillette Co.	16,209,877	14,028,616
Harbison-Walker Refractories Co.	5,052,637	3,395,157
Hussmann Refrigerator Co.	1,209,595	1,340,533
IBM Corp.	31,868,620	23,870,992
Koppers Co. Inc.	6,930,522	4,871,851
Mack Trucks Inc.	5,754,031	3,292,486
Minneapolis-Honeywell Regulator Co.	9,560,314	7,240,898
New York Air Brake Co.	1,162,958	803,733
Pittsburgh Screw & Bolt Corp.	1,046,120	482,416
Rackwell Mfg. Co.	4,332,000	2,787,000
Schick Inc.	692,801	315,522
Stewart-Warner Corp.	3,178,028	2,810,383
Sylvania Electric Products Inc.	7,323,515	6,088,019
Towmotor Corp.	1,329,378	701,066
Transue & Williams Steel Forging Corp.	320,153	218,987
Underwood Corp.	35,515	977,732
Union Carbide & Carbon Corp.	70,099,178	63,614,898
U. S. Pipe & Foundry Co.	5,368,370	4,975,839
Wagner Electric Corp.	2,870,015	2,343,113
Wayne Pump Co.	503,502	485,745
Westinghouse Air Brake Co.	6,135,849	3,227,911
Westinghouse Electric Corp.	11,713,000*	29,417,000
White Motor Co.	3,564,403	2,908,506
Worthington Corp.	4,529,719	3,602,491

*Not loss

and sales set records for the period, while new orders are 20 per cent ahead of last year's.

Clark Equipment Co.'s earnings jumped 24 per cent in the first half. Sales and earnings were both new records for the period.

Steel Sets New Records

With the steel industry operating at close to 100 per cent of capacity during the first half, new records for earnings and sales were commonplace.

Second Half—More new records may come in the second half to make 1956 the best year of all. The outlook is particularly good for such firms as Armco Steel Corp., which had about 50 per cent of its facilities operating during the strike. First-half sales were about \$385 million, compared with \$330 million in the same period last year.

Rising prices will help the sales and earnings in the second half. Eugene G. Grace, Bethlehem chairman, says his firm has a full three months of bookings on hand, and that demand created by the steel strike will not be met by the end of the year.

Expansion—Bethlehem's expansion program was slowed by a month and a half because of the strike. The proposed increase in ingot capacity will be reached this year, while new finishing capacity will be held back.

Shipments of steel products by U. S. Steel Corp. during the first half set a new record: 13,585,054 net tons in the first six months of 1956, compared with 12,834,336 net tons in 1955's first half. Earnings for the first half topped the previous six months' record set in the last half of 1955.

Doubled—Lone Star Steel Co. better than doubled its profits in the first half, compared with last year's.

Inland Steel Co. chalked up record first-half earnings, sales, production and shipments.

Barium Steel Corp.'s sales were up 75 per cent during the first half.

Allegheny Ludlum Steel Corp. announced that both second-quarter and first-half sales established records.

Warehouse Controls To Be Lifted in Two Weeks?



LOOK FOR the government to remove restrictions on steel warehouses within two weeks (STEEL, July 30, p. 52). Strong voices have been raised to lift the controls in one swoop, but it will come only after a product by product check to make certain no item is in short supply. To keep on the safe side, a few items may be held under the control orders. When warehouses are unfrozen, there will be relief from heavy set-aside requirements on mills that continued to operate during the strike. It's unlikely, though, that those mills will be forgiven set-asides in subsequent quarters; they'll have to go back to their prestrike requirements. Mills that continued to take defense orders through the strike will be required to fill oldest orders first.

Wanted: More Strategic Material Substitutes

High governmental sources have patted industry on the back for its fine job of developing substitutes for strategic materials. But the orchids could be just a feeler. Concerted action to get business to make even greater efforts to free the U. S. from dependence on overseas sources of raw materials may be coming.

Reconstruction Steel Needs Checked

A hitherto neglected factor is being considered in the re-evaluation of the steel industry's capacity to meet defense needs. It's a look at the steel that would be required for construction and rehabilitation after an enemy attack. Of special interest are capacities in structurals, plate, line pipe, oil field equipment and materials needed for private shipbuilding, freight car building and construction machinery.

Smaller Manufacturers Have It Rough

The Senate's small business committee is bemoaning a Commerce department report on the nation's business population. While the over-all number of businesses increased in the last three years, the number of manufacturing firms decreased. Comments the committee: "The increase in industrial concentration and current competitive conditions have played havoc with the smaller manufacturers."

Brazil Gets Ex-Im Credits

The Ex-Im bank has gone to the rescue of hard-pressed Brazil. Medium term credits extended include \$100 million to rehabilitate Brazilian railroads and lesser amounts for port facilities and electric power. Most of the loan funds will be spent in the U. S. Brazilians are also planning for increased production of iron and steel, aluminum and machinery.

Here and There

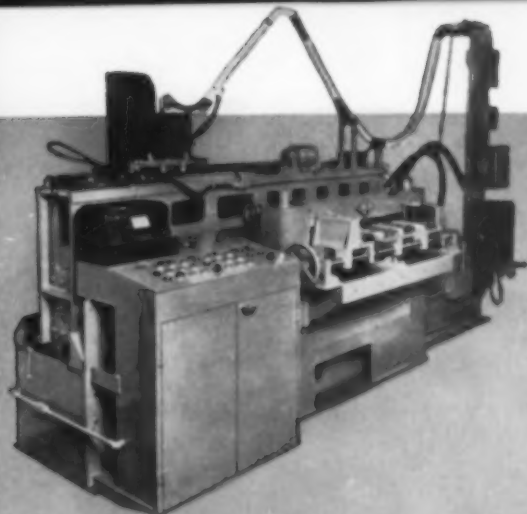
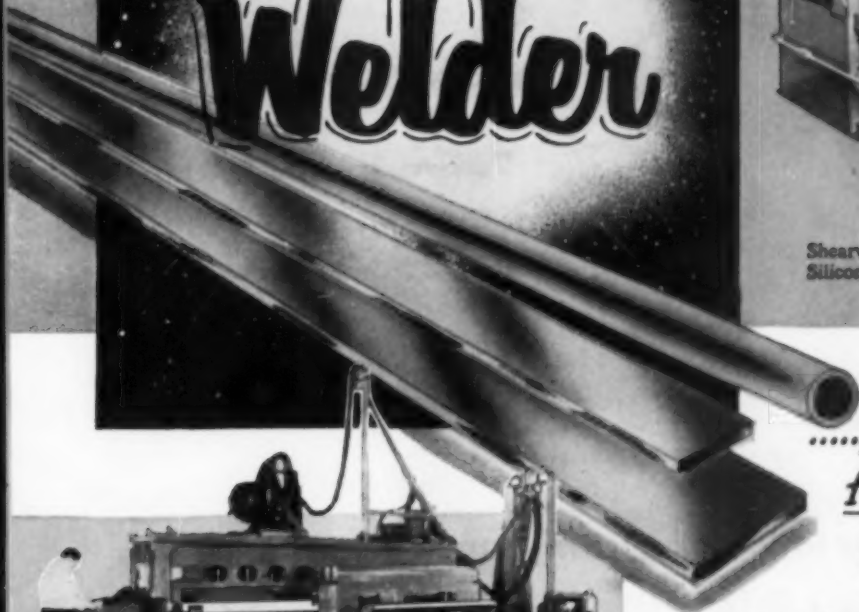
- Watch for the services to push for still greater reliability of electronic components. They are taking up a larger share of the total cost of combat equipment.
- Chance Vought Aircraft Inc. has a \$12-million contract for production of Regulus II guided missiles. Atlantic Research Corp., Alexandria, Va., will build small, solid propellant rockets for the earth satellite.
- Atomic Energy Commission will hold a session on effects of radiation on reactor components. Place: Chicago. Dates: Aug. 1-2.



Meet Robert W. Nissen: He's consultant to the metalworking equipment division, Business & Defense Services Administration. On loan for six months, his regular job is vice president and secretary, E. L. Essley Machinery Co., Chicago.

THE NEW

MPM Shear Welder



CONTINUOUS SILICON SHEET PRODUCTION

Shearwelder for coil build up line for 42" wide Silicon Steel from .015" to .030" thick.

.....more automation
for even faster
Steel Production!

● Metal Processing Machine Company's new Shearwelders are outstanding because of their advanced design incorporating automatically sequenced operations.

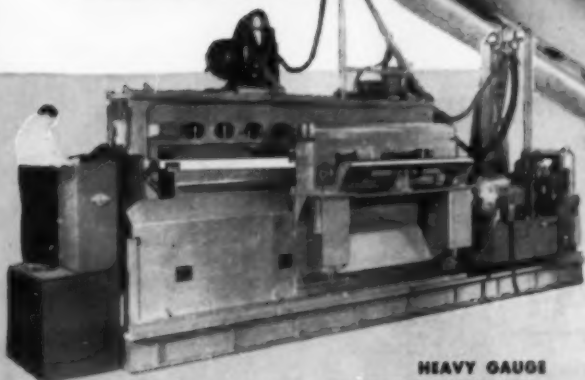
Shearing and welding are performed at the same station with positive clamping right at the work area, thereby insuring perfectly aligned butt welds.

"M.P.M." welds are **extremely ductile**, permitting subsequent rolling, forming, or blanking operations. Weld joints are smooth and require **no trimming**.

Rugged construction is insurance for minimum maintenance and compact design saves floor space.

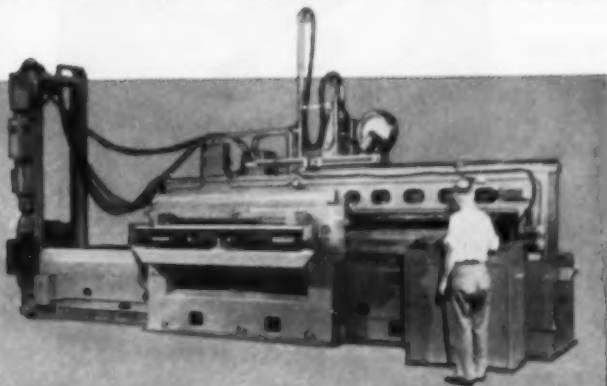
THE METAL PROCESSING MACHINE CO.

YOUNGSTOWN, OHIO



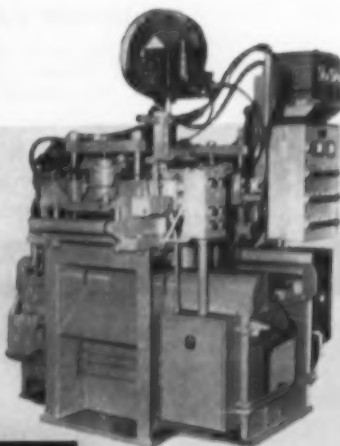
HEAVY GAUGE STAINLESS PRODUCTION

Shearwelder for butt welding 60" wide x .250" thick Stainless Steel.



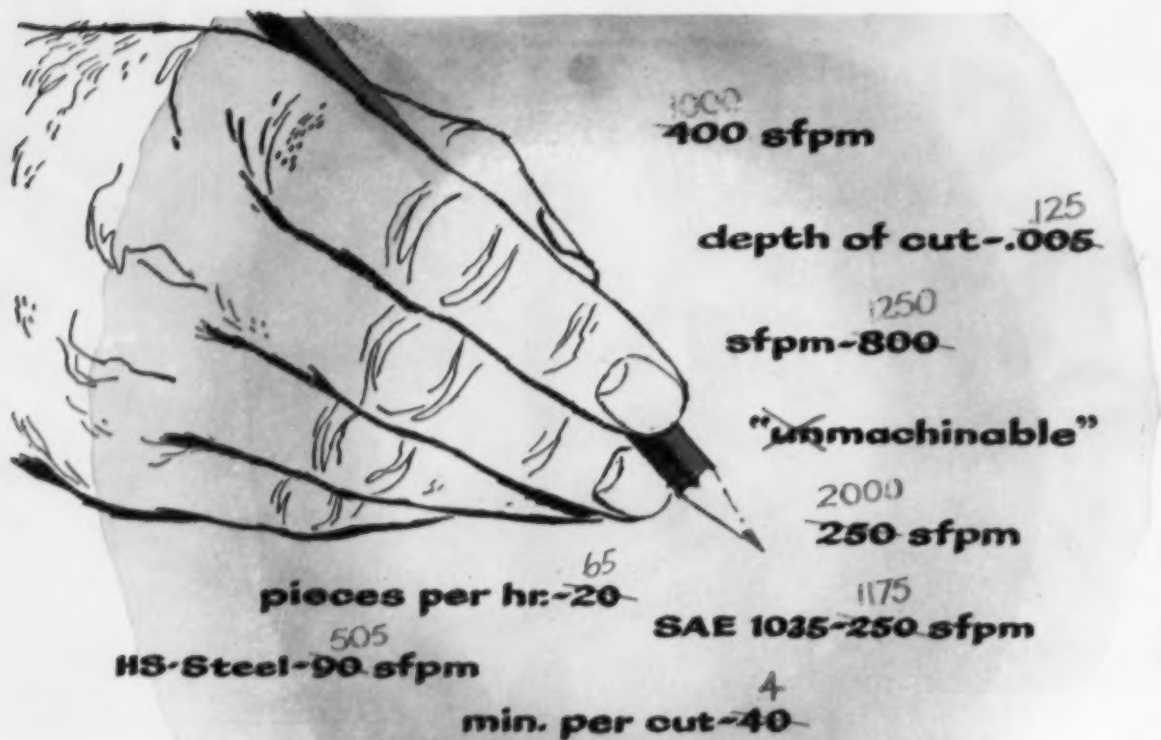
MAJOR COIL BUILD UP

Shearwelder for Carbon Steel coil build up line for .015" to .060" thick x 72" maximum width.



CONTINUOUS TUBE MILL PRODUCTION

Shearwelder used with strip looping device for splicing coil to coil to permit continuous production of tube mill.



you can scrap your ideas of cutting-tool performance . . .

STUPALOX

introduces a **NEW ERA!**

The figures above show the amazing improvements in production obtained through the use of STUPALOX sintered oxide cutting tools in place of tools previously used. Actually the figures are conservative, because tool performance in many cases was limited by inadequate power and rigidity of the machine tool.

Stupalox Tools are available now in commercial quantities, and a variety of styles and sizes of inserts. Write for complete data.

HANDY PACKAGE — contains ten inserts

This compact plastic box provides a practical container for ten Stupalox sintered oxide inserts.

Stupakoff

DIVISION OF

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LATROBE,
PENNSYLVANIA

The **CARBORUNDUM** Company





Pipe Machinery's Briner: Team Maker

IN 1948, C. V. Briner gave a dinner that has been paying off ever since.

In attendance were floor sweepers, machine operators and office girls—every member of the gage division of the Pipe Machinery Co., Wickliffe, O.

Operators' Ears—As the newly named division manager, Mr. Briner went to that dinner armed with a paper and an idea. The paper was a profit and loss statement. The idea was this: "Quality and cost control lie right between our operators' ears."

After reviewing the profit picture, the floor was opened for questions about the gage business. "I was amazed at how little they knew, and how much they wanted to know," says Mr. Briner.

Morale Maker—Out of that meeting came an agreement that each operator would assume responsibility for the quality of the product. The immediate result was increased accuracy, a reduction in scrap and rejections and a big boost in morale.

Typical of Mr. Briner's system is the delegation of authority to his right and left hands, Miss Gertrude Alexander and Nick Atves. Miss

Alexander, his executive assistant, is chief coordinator of the production, engineering and order departments. Mr. Atves is production superintendent.

Says Mr. Briner: "If you get the idea I'm proud of this organization, you're right. I've got a good crew of people doing my work for me."

Responsibilities—The big payoff from Mr. Briner's close contact with his men is found in the division's policy of operator responsibility for quality and costs. Each operator is provided with precision inspection equipment. The product moves from operator to operator to the finishing room, then shipped, with no formal inspection step (except for special orders requiring inspection under controlled temperature conditions).

Mr. Briner concludes: "Quite often operators ask how the company made out on a particular job. That's evidence of a pride of craftsmanship, which is unusual today. Our men really feel they are a part of Pipe Machinery."

Perhaps this is the crux of Mr. Briner's philosophy: "Labor means flesh and blood men, and you can't treat men like juvenile delinquents."

How To Plan Capital Needs

The money market is tight. When you can get them, loans cost more. Here's how small and medium-sized companies can plan to reduce the pressure

WHAT can you do to ease the money squeeze?

There are several places you can go for help. But whether you need \$200,000 to carry seasonal inventories or \$2 million for 15 years to finance expansion, how easily you get your money and how much it will cost depends directly on the reputation of your management.

Welcome—For small and large companies alike, asserts the Investment Bankers Association of America, Washington, demonstrated managerial ability is the key that opens most safes. The small businessman, particularly, too often

doesn't sense financial problems until he can't pay his bills. Any borrowing he does then will be costly. Terms are much better if capital needs are anticipated.

Fairly obviously, the first step in looking for help is the commercial bank, which functions as the general practitioner of the financial industry. But what do you do if your ills can't be treated by your company's family doctor?

The Specialists — Short-term working capital, ordinarily thought of as the bank's province, can also be had from two other sources. The first, a field warehouse; the second, a commercial finance com-

pany or commercial factor. Field warehouses loan either their own or the bank's money against your raw material or product in process inventory. Factors specialize in loans against accounts receivable.

Both types of money cost more than the unsecured bank loan, but there are compensations. Field warehousing permits you to build inventory without reducing working capital; commercial factors do a skin-tight job of tailoring borrowing to business volume. For details on these two sources, see **STEEL**, Mar. 21, p. 74 and Dec. 5, 1955, p. 85.

Pinched?—Industrial financing houses are your doctor if you need money over three to five years to expand production capacity. Companies like C.I.T. Financial Corp., New York, specialize in five and six figure loans to finance machinery and equipment. Repay-

Where To Look for Money



1. Stock or Bond Issue

Advantages: Stock issues increase the source of potential capital. If dividend experience is satisfactory, stockholders will come through again when more capital is needed. A larger capital base helps you get short-term working loans. Shareholder's talents are added to company's management know-how.

Disadvantages: Owner's interest in his business, and his authority, are diluted.

Where To Go: You can sell stock to employees, to friends, customers, suppliers, even to competitors. A public offering is standard for large companies; smaller ones may be able to interest professional investment groups.

For Advice: Check your local investment banker. His national headquarters: Investment Bankers Association of America, 425 13th St. N.W., Washington 4, D. C.

2. Commercial Banks

Term: Commercial banks are the primary source for short-term working capital. A typical note runs

90 days, though banks will go longer. They usually require clients to pay up their accounts completely at least once each year.

Requirements: Bank loans may be unsecured. They are also made against securities held by the company, against cash value of insurance in name of the company, against accounts receivable and against inventories. The company's reputation, managerial skill and potential are big factors in setting both amount of loan and its cost.

3. Industrial Financing Houses

Term: Most loans are made in the three to five-year bracket, for buying new equipment and machinery. Some loans, though, may run as long as ten years before maturity.

Requirements: Like the commercial bank, industrial financing houses require proof of managerial ability. Would-be borrowers should furnish their financial reports for the last few years. Loans are

ments are geared to depreciation schedules.

If you need longer term money for plant expansion or a new building, check with the insurance companies. Some specialize in industrial paper. Usually, insurance company loans are secured by real estate, and run between 10 and 15 years.

Uncle Sam—But maybe you're a small company, and can't buy your cure from any of these specialists. The Small Business Administration is your court of last resort. Its first requirement: You must have had the cold shoulder from all regular sources. SBA can loan money for any business need and for any term.

On secured loans, it will come through with up to 80 per cent of the appraised value of land with a building on it, up to 70 per cent on buildings and 50 per cent on vacant land. On new machinery, it will lend as much as 65 per cent; on cars and trucks, about 50 per

cent. In the last fiscal year, it approved loans of \$126.4 million.

Wall Street?—Even small companies shouldn't overlook the stock sale if they need money for growth. Another specialist, the investment banker, can give you best advice here. He might steer you to one of the country's 25 major private investment groups. He'll show you how to protect your interests in selling stock to other investors. He may even form a syndicate himself to handle your problem.

Point to remember: All sources of capital have one thing in common. They are lending not so much against inanimate assets as they are against their evaluation of management. The more certain they are that a company's management is sound, the better the break it will get on interest rate and other terms.

** An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

usually secured. Existing machinery is the most common collateral.

4. Insurance Companies:

Term: Insurance companies like 10 to 15-year loans, making most of them for building new plant, or for expansion.

Requirements: The same as those of other lending agencies: Good credit, good management, good history and good prospects. Most loans are secured by using the company's real estate as collateral. General purpose buildings are better collateral.

5. Small Business Administration:

Term: SBA straddles all fences. It will make short-term working capital loans up to \$15,000. It also handles three to ten-year expansion loans.

Requirements: Borrower must supply proof that he can't get money from local sources. SBA will accept any of the usual assets as collateral. Company's record must also be clear of any difficulties with the government; it must sign a security form.

Railroads To Buy

More freight cars, electronic and passenger equipment will keep capital investment high

THE NATION'S rail carriers will need an average of 75,000 new freight cars each year for at least the next five years, says William T. Faricy, president of the Association of American Railroads.

At present prices, Mr. Faricy says, the cars will cost about \$3 billion, about the same amount the railroads have spent on new freight cars during the last ten years.

Mr. Faricy asserts the new cars will be more efficient and economical than their predecessors, and should pay for themselves through increased traffic and reduced expenses.

Nearly Over — The industry's \$11 billion postwar improvement program, including the change-over from steam to diesel power, is 90 per cent finished. But Mr. Faricy declares that innovations in electronic communications and striking advances in passenger equipment will require a continuation of spending for capital improvements.

AAR's president says the carriers will have to rely primarily on retained earnings to carry out their programs. Financing the improvements with equity capital (such as common or preferred stock) is generally not feasible, he says, because of the present state of railroad credit.

Mr. Faricy notes that credit depends to some extent on the rate of return. Even in their best years, railroads have averaged only a little over 4 per cent.

Licenses for Nodular Iron

Allis-Chalmers Mfg. Co., Milwaukee, will license its process for making nodular iron. Dr. Harry K. Ihrig, vice president-research, reports that a license form will be ready this week. About half a dozen firms have expressed interest.

The firm is producing 50 tons of the metal a day. Capacity may be doubled soon.

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For Trouble!"**

if you buy on price alone



BULLARD

"Like many other firms," says Mr. A. Balas, Equipment Engineer at Mergenthaler Linotype Co., N.Y.C., "we are constantly on the alert for new equipment, new processes and new ideas. This constant search for improvement convinced us of the need to purchase a versatile, time-saving, cost-saving and, above all, accurate Horizontal Boring Machine. We checked them all — feature for feature — and then bought the Bullard H.B.M., Model 75. We feel it has enough "built in reserves" to take care of any contingency or new development which may come up. It's reassuring to know that an investment of this size won't go out of style next month."

Why don't you get the full story on the many features and advantages offered you with a Bullard H.B.M., Model 75 in your plant. For a complete line catalog, just call your nearest Bullard Sales Office, Distributor or write

THE BULLARD COMPANY BRIDGEPORT 9, CONN.

Station Wagon Sales*

(Thousands of units)

1956	780†
1955	759
1954	349
1953	297
1952	169

Source: Automobile Manufacturers Association
(Totals adjusted)

*Passenger car chassis only
(Estimated by STEEL)



American Motors Corp.

Despite slump, auto makers are pleased because . . .

Station Wagon Sales Hold Up

STATION WAGONS are still going strong. Their sales should be 3 per cent higher than they were last year, even though the industry as a whole has slipped below last year's levels.

Styling innovations will help boost 1957's sales a good 10 per cent higher than the 780,000 wagons expected to be marketed this year. Six-seater, four-door models still will be most popular. This style takes more than 50 per cent of current output. The rest is split between six-passenger, two-door models and four-door, eight-passenger jobs.

Leaders — It's estimated that Ford Motor Co. and General Mo-

tors Corp. each are accounting for about 35 per cent of total wagon production. Chrysler is third with some 16 per cent and American Motors' Rambler is taking close to 10 per cent. It may give Chrysler a run for its money next year.

Ramblers will be marketed on their own in '57. They'll be divorced from the Nash-Hudson names. It's understood that the bigger models will sport AMC's new V-8 engine.

Willys—Willys is plugging along with its four-wheel drive. Jeep station wagons still are designed primarily as cargo carriers, not for plush passenger transportation. Willys plans to keep it that way. Four-wheel drive and economical

operation assure a steady market.

Among the different makes Buick, Pontiac and Chevy show biggest increases over last year. Early in the production runs *Ward's Automotive Reports* listed Buick output at 130 per cent of 1955's. Pontiac and Chevrolet were 18 and 17 per cent higher.

Placement — Ford, Chevy and Plymouth hold down the one, two, three spots, as they did last year. AMC's Rambler is up from sixth to fourth. Pontiac still holds fifth, and Buick is up from eleventh to sixth, according to *Ward's* earlier statistics.

Mercury has dropped this year, it's in eighth or ninth place. Look for this Ford division to come out next year with hot styling which will push it back up toward the fourth place slot it held in 1955.

Studebaker is away down on the list. It may not even bring out a station wagon model for '57, preferring to concentrate on the sports

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car field where it has showed some signs of life. Oldsmobile is expected to introduce a wagon body this fall.

Styles — What will '57 station wagons look like? They'll have more glass to cut out blind spots in rear corners. A couple of models are supposed to sport electrically operated rear deck lids and slide-out cargo racks.

Chrysler's experimental Plainsman points up how spare tires can be hidden in rear fender wells to make more carrying space. It's still possible that at least one maker will drop the spare, putting its product on Goodyear's Captive Air tires. Also likely: Removable observation seats and swing down rear steps.

Slider—One of the Big Three has been working with a sliding panel roof. When the rear panel is pushed forward, cargo can be loaded from above. It has plenty of room to stick out the top. Pushing the front half backward turns it into a convertible. It isn't scheduled for '57 production but might show in 1958.

The station wagon graduated from the utility carry-all class into the luxury group some time ago. It will be hard to reverse the trend. Most suburbanites don't mind. As family size increases and the rush to suburbia continues, Detroit is casting an appreciative glance at the station wagon. It's a steady strong spot in an up and down sales race.

Free Piston Clamor

Ford Motor Co. agrees with other auto makers that the free piston engine may some day replace present piston engines, but several problems have to be solved.

Paul Klotsch, Scientific Lab engineer at Ford, says: "The noise level of the engine is high for passenger car operation, and engine controls must be improved."

Engineers think the free piston power plant is potentially so trouble-free that it may be marketed as a sealed package some day. Before then, the slide rule experts will have to find a simple way to start it. One answer: A pneumatic system with diesel-type compression ignition.

The big question in Detroit: Which will come first, the free piston or gas turbine? Fence sitters say the free piston may act as a natural stepping stone to the turbine. That isn't likely. It would cost too much to make both.

It seems unlikely that any auto maker will use one or the other before 1960. Present day reciprocating power plants have too much undeveloped horsepower that can't be wasted. Tooling costs for any new engine would take a healthy bite out of budgets which already are strained by plant expansion programs.

Pontiac Goes to Flow Coat

A double paint priming line is in operation at GM's Pontiac Motor division, Pontiac, Mich. It's installed in a 25,200 sq-ft addition to the assembly line.

S. E. Knudsen, Pontiac's general manager, explains that the flow coat system replaces tanks in which Pontiac used to dip sheet metal parts to prime them prior to final painting.

The new method first bonds sheet metal parts with a chemical

cleaning solution. Charcoal gray prime paint then is flowed on from a bank of 80 spray nozzles.

Parts are conveyed through a drip area and into 1000-ft bake ovens to dry for 75 minutes. After that, they're ready for final lacquering. Pontiac figures the new method saves time and insures a longer-lasting finish.

Ford Doubles Area

Ford Division, Ford Motor Co., is doubling the manufacturing area of its Atlanta assembly plant by adding 407,000 sq ft, reports W. A. Folsom, general manufacturing manager.

"Construction at Atlanta is scheduled for completion in late 1958, and we'll begin work as soon as contracts can be let," he says. Unit capacity will not increase. The plant turns out 334 vehicles in an 8-hour shift.

There are no immediate plans to run two shifts. Mr. Folsom explains: "This program is planned to provide capacity when and if we need it." Other previously announced area projects include plants at Nashville, Tenn., and Sheffield, Ala.

Exhaust Notes

- Studebaker - Packard Corp. called attention to itself again as it attempted to work out merger details with Curtiss-Wright Corp., Dayton, O. C-W reportedly will get an option to buy 7 million shares of S-P stock at \$5 a share. It would take over direct control of the auto company's management; emphasis would be on defense work.

- Willys Motors Inc., Toledo, O., is making its own Jeep cabs. Sporting steel construction and a fiber glass top, the cab can be installed either at the factory or by dealers.

- Automobile Manufacturers Association reports first-half factory sales of motor vehicles from U. S. plants totaled 3.8 million. Last year, the six-month tab was 4.8 million.

- Buick turned out 162,825 cars equipped with power steering in the first half of this year. That's some 13,000 more than any other auto maker.

U. S. Auto Output

	Passenger Only	
	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,141†	649,393
6 Mo. Total	3,192,349†	4,257,154
July		659,763
August		614,493
September		461,591
October		517,813
November		749,061
December		682,257
Total		7,942,132
Week Ended	1956	1955
June 30	103,037	158,402
July 7	68,110	134,092
July 14	112,361	167,473
July 21	113,416	196,434
July 28	112,588†	161,370
Aug. 4	109,300*	140,788

Source: Ward's Automotive Reports
†Preliminary *Estimated by STEEL.

THE STRANGE CASE
OF THE

MISSING PRODUCTION COST



ONCE upon a time there was an accounting department that was used to heavy costs to replace worn-out production tools. One month, when they were checking out their figures and preparing cost analyses, part of this cost was missing. Of course this bothered the accounting department because the treasurer of the company needed this cost so he could growl

at salesmen when they turned in their expense accounts. They started a systematic check—the kind that only accountants can dream up, and found that the production department had started making a lot of parts out of Copperweld Leaded Alloys—the steels with “built-in productivity.” Because of its extreme machinability, they were enjoying not

only faster feeds and speeds and high production savings but production tools were lasting much longer—in some cases as much as 10 times as long. The story has a happy ending because everybody was delighted with lower production costs—even the treasurer. He hasn't snarled at a salesman's expense account in months.

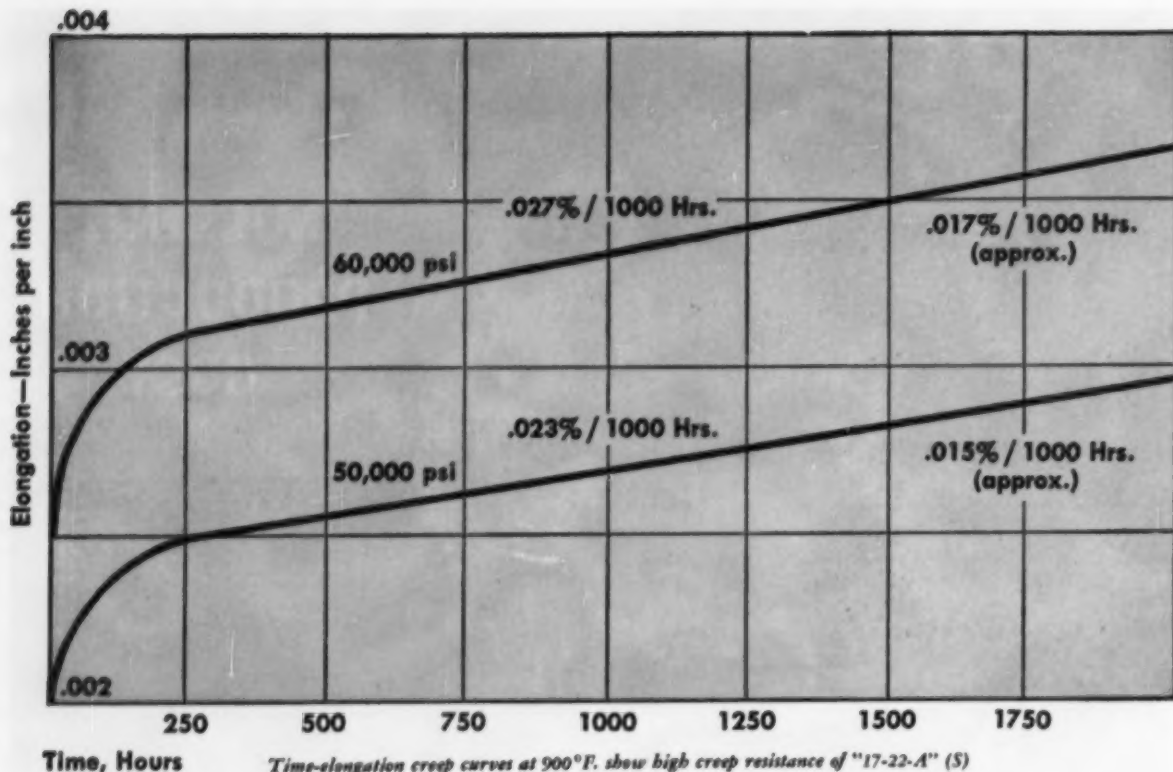


COPPERWELD STEEL COMPANY
Steel Division • Warren, Ohio

EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

For further details
on Copperweld
Leaded Alloys,
write for free
booklet, "Lead
Treated Steels."





How to get high turbine alloy performance with low alloy steel

If you produce gas turbine parts or other parts that operate at temperatures as high as 1000 degrees F., you may feel you have to use an expensive high alloy steel.

But you can make parts that will do the same job, and save strategic alloys, using "17-22-A" (S) steel made by the Timken Company.

This steel helps you cut costs because it contains only 3% alloy. Yet it gives excellent creep resistance up to 1000 degrees F. The graph above shows it at 900 degrees F.

There are other advantages. "17-22-A" (S) resists heat checking and thermal cracking. It is readily work-

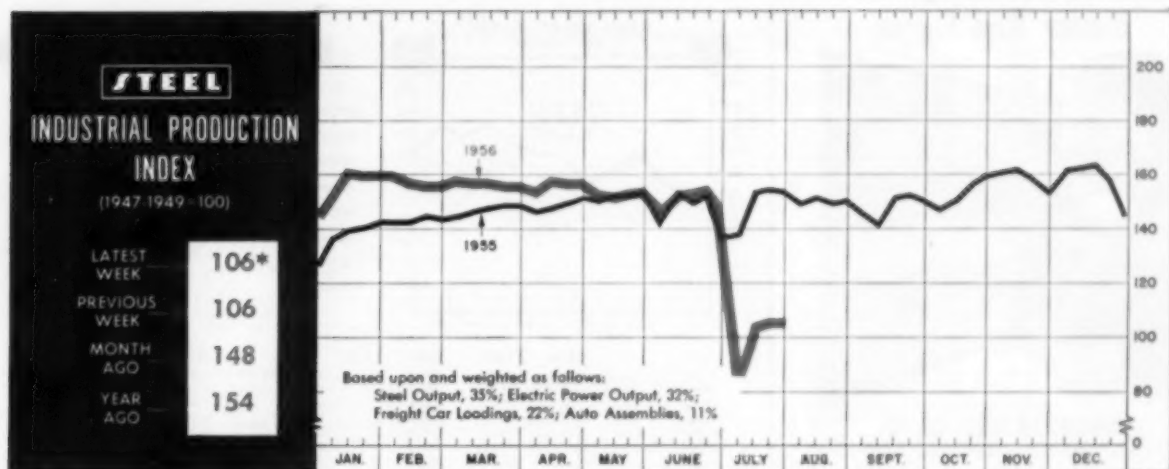
able up to 2300 degrees F. It's easy to machine and weld. And maximum high temperature properties can be developed by normalizing and tempering, minimizing the possibility of distortion and quench cracking.

For complete information on "17-22-A" (S) steel, and its companion analysis, "17-22-A" (V), recommended for temperatures up to 1100 degrees F., write for Technical Bulletin No. 36A. And for help with your high temperature steel problems, call upon our technical staff. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended July 28

Business Outlook Confounds Pessimists

DOUBTERS who still can't see new strength in the economy better take another look at the record. Business is going as well as ever after taking two hard blows (the prolonged auto slump and a steel strike) in quick succession.

STEEL checked representative companies in several of metalworking's bellwether industries. Two questions were asked: Will the strike affect your business for the rest of the third quarter? What is your outlook for the fourth quarter and the year? Here's how some of the operating rates stack up.

New High—There's a new look in the gray iron foundry business. Business normally takes a slide from July through September. This year, it's not materializing. The only weak spots are in light castings, where the automotive industry is the key. But medium and large castings are going so well that the foundries still can't quite believe their order books.

Business is running ahead of last year's. Outlook is for a further gain in the last quarter, with total shipments some 5 per cent over 1955's \$14.8 million.

Test Case—It's well known that users of structural steel and plate have been hardest hit by the strike. But steel foundries, much of whose production goes to the

freight car industry, are operating above last year's third-quarter rate also. Even though the structural situation won't ease much after the mills get back in operation, steel founders say they expect the freight car people to turn out 6000 to 7000 units a month.

An Ohio welder manufacturer gives the answer: "Sure, our ship-

ments to the freight car builders and to construction will be off some. But our other customers are doing so well that we will still be ahead for the year."

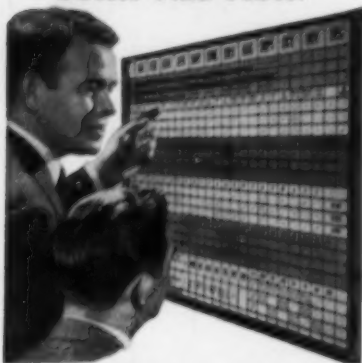
Balance—Many metalworking segments came through the strike without trouble. Says one gear and drive maker: "We're up about 10 per cent from the third quar-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons) ² . . .	431	377	2,098
Electric Power Distributed (million kw-hr) . . .	11,200 ¹	11,125	10,727
Bituminous Coal Output (1000 tons) . . .	9,045	7,150	9,400
Petroleum Production (daily avg.—1000 bbl) . . .	7,000 ¹	7,110	6,816
Construction Volume (ENR—millions) . . .	\$396.9	\$391.3	\$366.2
Auto, Truck Output, U. S., Canada (Ward's) . . .	109,300	112,588	140,788
TRADE			
Freight Car Loadings (1000 cars)	640 ¹	648	796
Business Failures (Dun & Bradstreet)	223 ¹	251	201
Currency in Circulation (millions) ³	\$30,632	\$30,808	\$30,157
Dept. Store Sales (changes from year ago) ³ . . .	+ 2%	+ 2%	+ 12%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions) . . .	\$21,568	\$22,426	\$20,455
Federal Gross Debt (billions)	\$272.9	\$272.8	\$277.3
Bond Volume, NYSE (millions)	\$17.8	\$18.3	\$18.7
Stocks Sales, NYSE (thousands of shares) . . .	10,549	11,311	11,165
Loans and Investments (billions) ⁴	\$84.9	\$85.1	\$85.2
U. S. Govt. Obligations Held (billions) ⁴	\$26.3	\$26.3	\$32.6
PRICES			
STEEL's Finished Steel Price Index ⁵	210.45	210.45	207.63
STEEL's Nonferrous Metal Price Index ⁶	261.1	259.6	240.2
All Commodities ⁷	114.1	114.0	109.9
Commodities Other Than Farm & Foods ⁷	121.4	121.3	116.3

*Dates on request. ¹Preliminary. ²Weekly capacities, net tons: 1956, 2,461,892; 1955, 2,413,278. ³Federal Reserve Board. ⁴Member banks, Federal Reserve System. ⁵1935-1939=100. ⁶1936-1939=100. ⁷Bureau of Labor Statistic Index, 1947-1949=100

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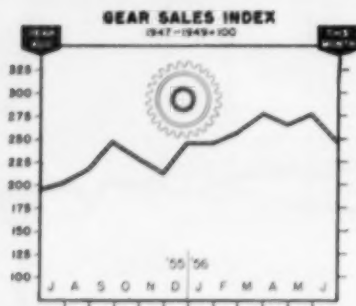
We couldn't begin to mention, in this limited space, all of the uses to which Diamond Perforated Metals are being applied today. In addition to the Sizing Screens and Ornamental Grilles, with which we started forty years ago, we now serve a great number of leading engineering and manufacturing organizations in such fast-moving fields as Air Conditioning, Atomic Energy, Aviation, Chemical Processing, Electronics, Noise Control, Smoke Abatement, etc.

To meet these widely diversified and constantly growing requirements we have developed hundreds of specialized tool arrangements which enable us to give superior service at competitive costs. Write for Catalog 39 and tell us about YOUR requirements. No charge or obligation for estimates and suggestions.

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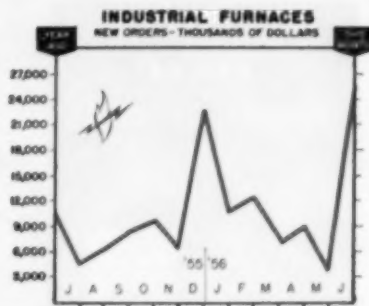
West Coast Plant, Diamond Perforated Metals Co.
17915 So. Figueroa St., Gardena, California

THE BUSINESS TREND



	1956	1955	1954
Jan.	245.5	140.9	147.4
Feb.	286.2	148.5	165.1
Mar.	276.5	172.8	128.8
Apr.	264.7	179.8	158.3
May	275.6	205.2	132.5
June	245.4	193.5	127.4
July	...	201.7	141.3
Aug.	...	217.6	154.7
Sept.	...	246.5	135.1
Oct.	...	227.4	152.3
Nov.	...	210.4	116.7
Dec.	...	246.5	182.2

American Gear Mfrs. Assn.
Industrial Heating Equipment Assn. Inc.
Charts copyrighted, 1956, Street.



	1956	1955	1954
Jan.	10,244	4,973	3,643
Feb.	12,163	5,616	3,086
Mar.	7,025	7,348	4,079
Apr.	8,503	7,639	3,496
May	3,629	6,205	5,848
June	28,597*	10,616*	5,063
July	...	4,273	1,684
Aug.	...	8,351	2,570
Sept.	...	9,568	3,837
Oct.	...	6,180	3,188
Nov.	...	22,548*	6,847
Dec.	...	...	...

*June, 1955, and 1956 and December, 1955, figures include steel mill furnace orders

ter of last year. The steel shortage hasn't hurt us, and we don't think it will."

A maker of electric motors points out: "We're just coming into our two-week vacation period. The breather will mean that we'll have no trouble making shipments when we go back." For the year to date, his company has been operating 20 per cent above its 1955 rate.

No Cancellations—A manufacturer of electrical controls points out that companies doing business with steel mills had orders postponed, but not lost. His new orders began to turn up across the board in the last half of 1955. Since then, they've gained 50 to 60 per cent. Shipments have been pushed up to match. Again the comment: "The steel strike caused us no trouble. Outlook for the rest of the year? Terrific."

Like most steel users, fastener makers and producers of screw machine products said that their stocks were big enough to handle a longer strike, though some specialty manufacturers point out that the warehouse freeze on stainless could have bothered them. What about the rest of the year? "Releases are now coming in for

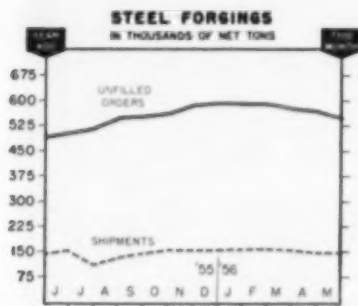
the fall automotive, appliance and electronic programs. Business is still on the way up."

Yes, metalworking has taken two substantial body blows, and is coming back for more. While it would be foolish to suggest that we'll have a Utopia from here on out, the record proves that the economy is not inherently unstable. It is stronger than even the optimists had hoped.

Auto Pickup Coming

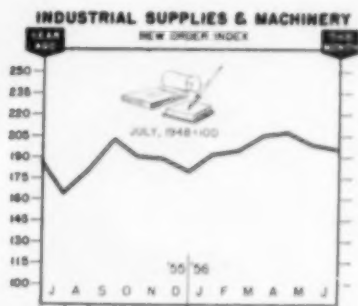
The automobile industry is coming back to life. The year is still expected to be fifth best for car-makers. Sales were starting to pick up again last month. Dealers are estimated to have moved some 480,000 units, a performance bettered only in July of last year and July, 1953.

Faced with a growing danger that dealers may run out of cars before 1957 models reach the floors, Ford and Dodge have increased their 1956 production plans. According to *Ward's Automotive Reports*, dealers of more than one low and medium price make will enter the September market with a complete sellout assured. The fourth quarter is ex-



	Shipments		Unfilled Orders	
	1956	1955	1956	1955
Jan.	160	136	589	453
Feb.	152	135	589	460
Mar.	159	154	578	479
Apr.	150	150	569	475
May	151	147	551	488
June	155	155	501	501
July	115	...	513	...
Aug.	135	...	547	...
Sept.	149	...	552	...
Oct.	158	...	560	...
Nov.	158	...	585	...
Dec.	158	...	592	...

U. S. Bureau of the Census. Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more.



	1956	1955	1954
Jan.	192.7	164.4	139.5
Feb.	195.9	175.1	140.5
Mar.	206.7	156.9	141.5
Apr.	208.6	173.7	131.9
May	200.6	191.6	129.4
June	197.8	189.1	136.4
July	163.7	219.4	...
Aug.	181.2	132.5	...
Sept.	203.3	145.1	...
Oct.	190.0	136.3	...
Nov.	189.7	146.2	...
Dec.	150.0	148.8	...

Amer. Supply & Machinery Mfrs. Assn.

pected to bring 1956's sales up to 5.9 million cars.

More Sales to Aircraft

The aircraft industry's suppliers can look forward to continuing good business through the rest of the year and well into 1957. Planemakers have an estimated \$14.3 billion backlog on their order books. In 1955, their sales were only \$8.2 billion.

The total aircraft backlog will mean at least \$3 billion in business for subcontractors. On typical Air Force contracts with one company, subcontracting averaged from 25 to 45 per cent of the total dollar volume.

Tool Outlook Stays Strong

Look for machine tool orders to pick up again after a slight slide through June and July. Spokesmen in industry believe that the effects of last year's machine tool show on buyers are far from finished. Look for a new order total of close to \$1 billion for the year. First-half estimates peg new orders at \$509 million.

Reasons behind builders' optimism: Preliminary reports indi-

cate no letup in new plant and equipment spending for the remainder of the year. Some spot checks indicate that 1957 may well set another record. Builders point out that with the raw material and wage increases which are sure to follow last week's steel settlement, new production equipment is an even better bet for staying competitive.

Steel Ups Equipment Needs

Continuing expansion programs of steelmakers will be one big factor behind record performances anticipated in many equipment-making metalworking divisions.

Steel orders, for example, are the cause of the big bulge in new orders of industrial furnaces in June (see chart, page 96). Of the \$25.6 million recorded this year, \$20.8 million came from steelmakers. The Industrial Heating Equipment Association enters steel mill orders in its index in June and December each year. Last year's June figure was only \$4.8 million of the \$10.6 million total.

Motors, electric controls, drives, measuring instruments, steel mill and accessory equipment producers all will share in the boom.

NOW, ENGINEER BY TELEPHONE



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**ROLAND
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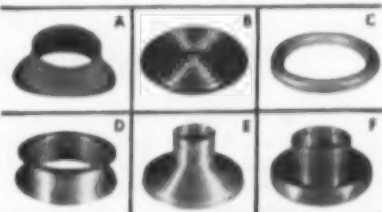
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quick reference
background to discover
economies by metal
spinning, spinforming
and hydroforming,
for model
making and
sample runs.



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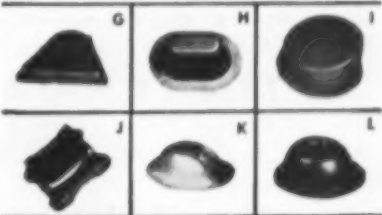
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for all fabrications including metal spinning, spinforming, hydroforming, welding and finishing.



METAL SPINNING AND SPINFORMING:

Typical items: A—Aircraft detail; B—Decorative cover; C—Retainer ring; D—Winding reel; E—Electronic shield; F—Electrical detail.

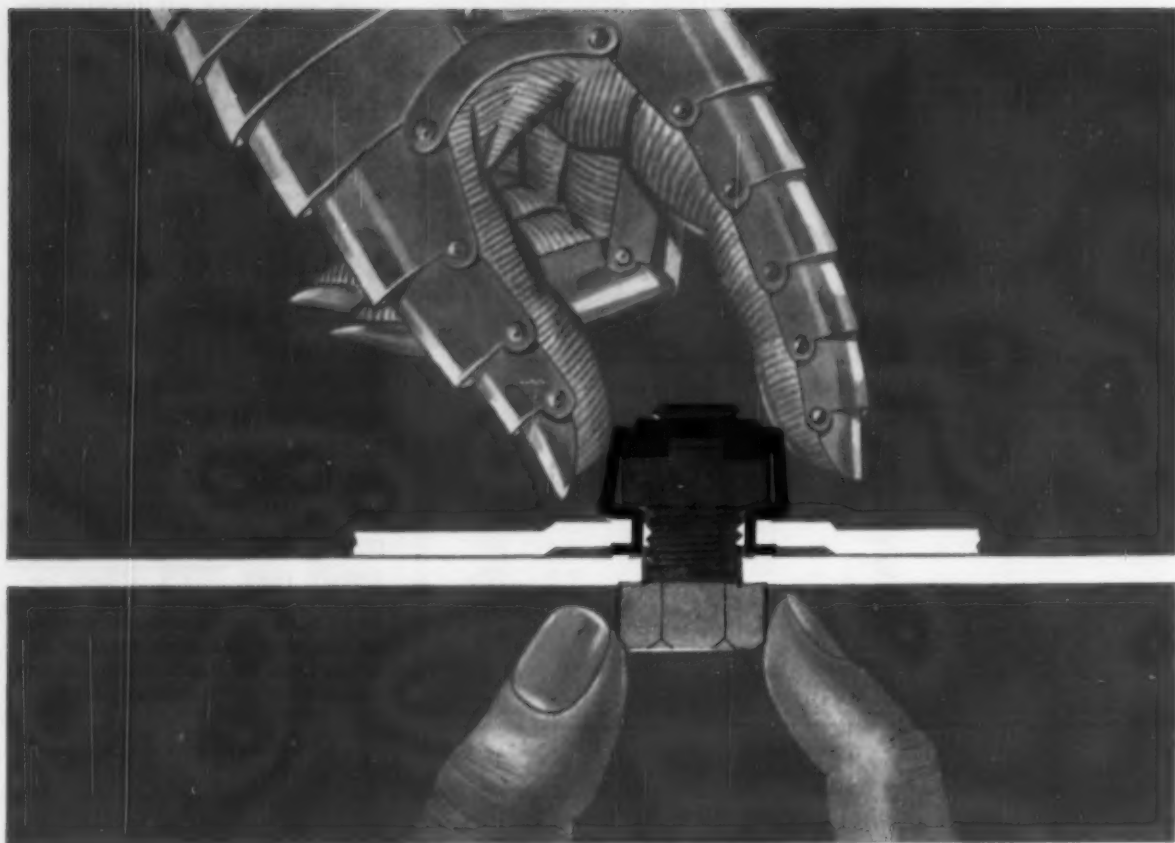


HYDROFORMING:

Typical items: G—Aircraft detail; H—Spindle cover; I—Aircraft detail; J—Auto bracket; K—Light reflector; L—Air cleaner.

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FINGERS OF STEEL that hold where you can't reach

If you can't reach the back of a panel to hold a nut, let the spring steel fingers of a Tinnerman SPEED GRIP® Nut Retainer hold it for you. No welding or staking, no special skills or equipment required. It's the most efficient way to attach a square nut to a panel in blind location.

The SPEED GRIP combines a square nut retained in a spring steel cage. The SPEED GRIP snaps easily into the panel. Expensive rigid position methods are eliminated. Nut floats free in the cage to offset minor hole misalign-

ments, but cannot turn as bolt is tightened.

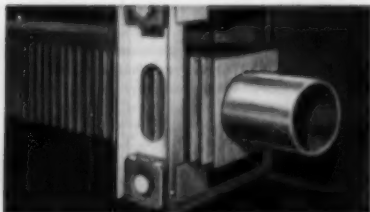
SPEED GRIPS can be put on anywhere along your assembly line . . . no side trips to special stations, no line deviations of any kind. Rust-proofed, they can be applied after painting, ending costly masking or retapping of paint-clogged threads.

Consult your Tinnerman representative soon and write for Bulletin No. 335. Tinnerman Products, Inc., Box 6688, Department 12, Cleveland 1, Ohio.

TINNERMAN

Speed Nuts

FASTEST THING IN FASTENINGS®



SPEED GRIPS eliminate several punched and tapped holes. cut assembly costs 78%, simplify installation of heater.



SPEED GRIPS applied *after* painting simplify blind-location assembly of auto seat handle, avoid paint-clogging of threads.



SPEED GRIPS cut costs 75% by replacing tapped holes and weld-type nuts as mounting fasteners on car radio.



ELLIS A. TRAUTMAN
... Mesta Machine plant mgr.

Mesta Machine Co., Pittsburgh, appointed Ellis A. Trautman general manager of its newly acquired New Castle, Pa., plant. He was vice president-sales and manufacturing at White Engineering Corp., Cambridge Springs, Pa. Named manufacturing manager at the New Castle plant was Leonard F. Quinn, formerly with Joy Mfg. Co.

Glar-Ban Corp., Buffalo, elected Francis J. Roggan president to succeed Robert B. Hill.

Russell L. Sylvester joined Rockwell Mfg. Co. as chief engineer of its central valve research and development department, Pittsburgh.

Frank O. Phillips was named assistant to vice president-steel of United States Steel Corp., Pittsburgh, with responsibility for maintenance planning.

Robert Nordin was made regional manager-southern Gulf states of All-State Welding Alloys Co. Inc., White Plains, N. Y.

J. Donald Judge was named director of research and engineering at Hamilton Foundry & Machine Co., Hamilton, O.

Kenneth H. Hannan was elected executive vice president of Union Carbide & Carbon Co., New York. He was vice president.



ALLAN S. ROBERTSON
... Fenwal v. p.-sales

Fenwal Inc., Ashland, Mass., made Allan S. Robertson vice president-sales. He was sales manager at the union switch and signal division of Westinghouse Air Brake Co., Wilmerding, Pa.

Jack S. Euphrat was named assistant to the vice president in charge of the National Can Corp.'s Pacific Division at San Francisco. Howard Smith, formerly assistant manager, succeeded him as manager of research.

Irving M. Oppenheim was made superintendent of the electrical department by Universal-Cyclops Steel Corp. at Bridgeville, Pa. He was assistant chief electrician of the Pittsburgh works of Jones & Laughlin Steel Corp.

Philip A. Gaebe was appointed a territorial sales manager by Kaiser Chemicals Division, Kaiser Aluminum & Chemical Sales Inc. He will be in Pittsburgh.

Sidney L. Fisher was elected to the new position of executive vice president at W. A. Case & Son Mfg. Co., Buffalo.

Breeze Corp., Union, N. J., appointed Kenith G. Strunk administrative director of engineering. He was president of the engineering consultant firm of Processes Research Inc.



T. S. BONNEMA
... Oster pres. & g.m.

Oster Mfg. Co., Cleveland, appointed T. S. Bonnema president and general manager. He was vice president and general manager.

Karl F. Ewerhardt was appointed to the new position of assistant general sales manager at H. K. Porter Company Inc.'s Leschen Wire Rope Division, St. Louis. Charles E. Brackbill was named executive staff assistant in production for its Laclede-Christy Co. Division, St. Louis.

E. W. B. Lewis was elected treasurer and J. P. Boyer auditor of Westinghouse Electric International Co., New York.

Dodge Division of Chrysler Corp., Detroit, appointed George H. Stover manufacturing manager-car operations; Robert L. Jenkins, general superintendent-car manufacturing; and Richard A. Vining, production engineering manager.

Robert D. Tuttle was made marketing manager at H. M. Harper Co., Morton Grove, Ill.

Chase Brass & Copper Co., Waterbury, Conn., appointed Allan R. Armstrong to the new position of staff manager of tube sales; John J. Vreeland to the new post of staff manager of sheet and



JULES CARDON
... *Servo dept. sales head*

strip; and Herman H. Kremer as staff manager of rod and wire.

Servo Corp. of America, New Hyde Park, N. Y., named **Jules Cardon** to head its new industrial sales department.

Robert J. Linney was elected vice president-operations, **Reserve Mining Co.**, Duluth. He was manager of operations.

Vincent Anson was named merchandising manager of galvanized ware for **Jones & Laughlin Steel Corp.**'s container division. His headquarters will be in Toledo, O. He formerly was general sales manager of **Nesco Inc.**

James R. Eagles was named assistant to the division manager, **Bryant Electric Co.**, Bridgeport, Conn., subsidiary of **Westinghouse Electric Corp.**

Richard C. Ten Eyck was made manager of tank lining and industrial rubber covered roll sales department, **Goodyear Tire & Rubber Co.**, Akron. He replaces **R. M. Junker**.

Diamond Chain Co. Inc., Indianapolis, elected **C. P. Kottlowski** president and general manager, succeeding **Guy A. Wainwright** who became chairman, replacing **C. C. Jarchow**. **H. Norris Cottingham**, vice president, was named assistant general manager and **G. E. Schloot**, vice president and director of personnel.



ARTHUR S. MINTO
... *Morgan purchasing mgr.*

Arthur S. Minto was named manager of purchasing and material control of **Morgan Engineering Co.**, Alliance, O.

Henry A. Jacker was made manager of foreign operations for **Roots - Connersville Blower Division**, **Dresser Industries Inc.** He has offices in New York.

Hallberg Hanson was appointed manager of the new **Polyken** plant being constructed in Franklin, Ky., by the Chicago Division of the **Kendall Co.**

Earl D. Hilburn was named West Coast manager for **Link Aviation Inc.**, Binghamton, N. Y.

John B. Giacobbe was appointed director of the new **Nuclear Products Division** of **Superior Tube Co.**, Norristown, Pa. He was plant metallurgist.

A. C. Sanger and **W. K. Stevens** of the **Valentine Fire Brick Co.** division of **A. P. Green Fire Brick**, Woodbridge, N. J., will be in charge of operations and sales, respectively, of three recently acquired plants: **Pyro Refractories Co.**, Oak Hill, O.; **Durex Refractories Co.**, Jackson, O.; and **Portsmouth Clay Refractories Co.**, South Webster, O.

Herman H. Flaum was named superintendent of cold and hot header operations at the two Cleveland plants of the **Cleveland Cap Screw Co.**



FRANK J. FINN
... *Yale & Towne plant mgr.*

Frank J. Finn was named manager of the Salem, Va., plant of the **Yale & Towne Mfg. Co.**, succeeding **Marvin C. Bonine**.

Rollie G. McNair was elected president of **Towne Mfg. Co.**, San Diego, Calif.

Elmer G. Westlund, formerly assistant purchasing agent, was named purchasing agent of the government's manufacturing plant at the **Raytheon Mfg. Co.**, Waltham, Mass.

B. M. Brown was made manager of the Baltimore divisions of **Westinghouse Electric Corp.** Formerly manager of the Baltimore air arm division, he succeeds **F. W. Godsey Jr.**, resigned. Mr. Brown is replaced by **Dr. S. W. Herwald** who was manager of engineering at the air arm plant.

William V. Luneburg was named manager of the Dearborn, Mich., assembly plant of **Ford Division**, **Ford Motor Co.** He succeeds **E. C. Miller**, on leave of absence.

Robert C. Conant was made manufacturing manager of the Jackson Division of **Aeroquip Corp.**, Jackson, Mich.

James F. Bere was made general manager of **Axelson Mfg. Co.**, Los Angeles, a division of **U. S. Industries Inc.** **Howard W. Carlisle** succeeds him as general manager of the Hamilton, O., plant of **Clear-**



CLEAN UP your "DIRTY WORK" OBTAIN PRODUCTION-GAITED EFFICIENCY —with a PETERS-DALTON

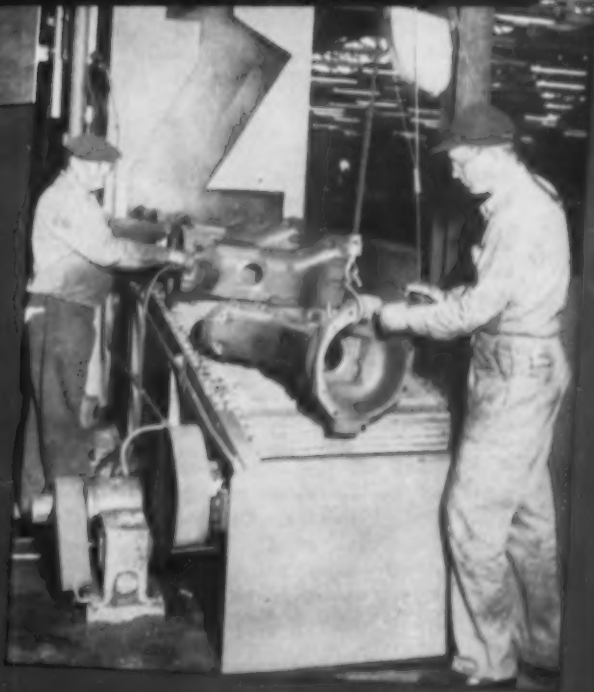
POWER SPRAY WASHER

P-D Two Stage Steam Heated Washer
Solution tank capacity is 1050 gallons. Tank temperature for caustic wash is 190° F. with heated water rinse of 180° F. — capacity of pumps 350 g.p.m. at 140 foot head. It is designed to handle maximum loads of 8000 lbs. per hour, conveyed on 32" wide belt with variable drives of from 1 to 3 feet per minute.



The P-D Power Spray Washer shown here is a work horse indeed. It was designed by Peters-Dalton engineers to deliver efficient cleaning operations for heavy tractor transmission housings and miscellaneous castings weighing up to more than 250 lbs. each . . . handling them with ease at a maximum speed of 30 of the largest pieces per hour. The illustrations above (at the left) show tractor transmission housings being lowered onto the conveyor belt for cleaning operations. The photo (at the right above) shows these housings leaving the washer . . . note the man blowing out cavities before the housings are conveyed back to final operations.

Peters-Dalton Power Spray Washers are designed, engineered, and fabricated for the job, and installed with an economy of floor space. Whatever cleaning operations you require . . . regardless of size, large or small . . . you can depend upon the more than quarter century of P-D know-how to deliver and install the washer most efficient for your needs.



Let us know your needs. Just write, wire or phone — we'll be glad to tell you more.

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- P_D Drying and Baking Ovens
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Peters-Dalton INC.

A DIVISION OF DETROIT HARVESTER CO.
17892 Ryan Road • Detroit 12, Michigan



NORMAN A. PRICE
... exec. v. p. of Colson

ing Machine Corp., another division of U. S. Industries Inc.

Norman A. Price was made executive vice president of Colson Corp., Elyria, O. He was vice president-sales.

Union Twist Drill Co., Athol, Mass., named Ben A. Fleury Jr. assistant sales manager. He was district manager of the Chicago territory.

Lionel Glauberman was made assistant chief engineer at Assembly Products Inc., Chesterland, O.

George R. Brockway was named executive vice president of Raymond Corp., Greene, N. Y.

Benjamin A. Kissam was made assistant general sales manager, Pontiac Motor Division, General Motors Corp., Pontiac, Mich.

C. F. Boyer was appointed special assistant to the sales manager, Alloy Tube Division, Carpenter Steel Co., Union, N. J. He was southeastern sales manager at Atlanta, and continues headquarters there.



H. CLAY OLIVER
... Robertshaw-Fulton div. p.a.

Robertshaw-Fulton Controls Co. appointed H. Clay Oliver as purchasing agent of its Fulton Synchron Division at Knoxville, Tenn., and named Harold W. Rice director of the West Coast Research & Development Laboratory at Los Angeles.

Stuart S. Power was appointed manager-evaporative cooler sales, Norris-Thermador Corp., Los Angeles.

John M. Suardi was made manager of the San Francisco sales office of Graver Tank & Mfg. Co. Inc.

General Electric Co. appointed Dr. Robert R. Johnson as manager of digital computer engineering for its industrial computer section, Syracuse, N. Y.

Richard H. Melvin was made sales manager for Sahlin Engineering Co. Inc., Birmingham, Mich.

S. G. Taylor Chain Co. Inc., Hammond, Ind., named Roy G. Oliver as executive vice president and treasurer and appointed E. W. (Ted) Chapman as secretary.



CHESTER S. JOHNS
... Cross Co. sales post

Chester S. Johns was named to the new post of sales manager for standard machines and products at Cross Co., Detroit.

George R. Winkley, former production control manager, was made treasurer and assistant to the president, Speedway Mfg. Co., division of Thor Power Tool Co., Chicago. W. E. Sopusek was made secretary.

Vickers Inc., Detroit, appointed Charles W. Newman manager-northwest branch, with headquarters in Seattle.

John J. McDonald was made assistant director, systems division, Consolidated Electrodynamics Corp., Pasadena, Calif.

R. G. Tower was named manager of Bristol Co.'s new western sales office in Denver.

George M. Halsey was elected vice president of the chemicals-pigments-metals division of the Glidden Co., Cleveland. He succeeds John P. Ruth who continues as a director, consultant and member of the executive committee.

O B I T U A R I E S . . .

Robert E. Belt, 75, retired secretary-treasurer of the Malleable Founders Society, Cleveland, died July 25. He also was vice president, Columbus Conveyor Co., Columbus, O.

John P. Deringer, 53, founder and president of the Deringer Metallurgical Corp., Skokie, Ill., died July 20.

Harold M. Graham, 66, founder and president of Graham Mfg. Co. Inc., Batavia, N. Y., died July 19.

Walter O. Larson, 55, president, W. O. Larson Foundry Co., Grafton, O., died July 28.

L. A. Davis, 56, vice president and district sales manager, Stulz-Sickles Co., Newark, N. J., died July 13.

Serves 'em right!



Photo courtesy
Norris Corporation, Inc.,
Milwaukee, Wis.



How Stainless Steel from
THE HOUSE OF STAINLESS
Provides the Sanitation, Strength and
Beauty Needed in Modern Milk Dispensers

THE NEED—A product exposed to public view must have the eye-appeal to harmonize with the finest surroundings. When it is used to dispense a food like milk, there can be no question about sanitation. And, in the case at hand, the product required a material that would also have the strength to withstand the constant battering of milk can traffic.

THE ANSWER—Faced with these requirements, Norris engineers turned to the House of Stainless for help in selecting the right stainless to meet their needs. Not only did the stainless steel recommended give them the sanitation, strength and beauty vital to the product, but in addition, the material lent itself more readily to their fabrication processes. Moreover, in service, the stainless proved easier to clean and assured long life for the product.

Here is another case where the choice of stainless steel produced bonus benefits in the finished product.

Whichever properties of stainless steel your product may require, you can always count on extra performance from this versatile material.

Let The House of Stainless help you make the proper selection and supply

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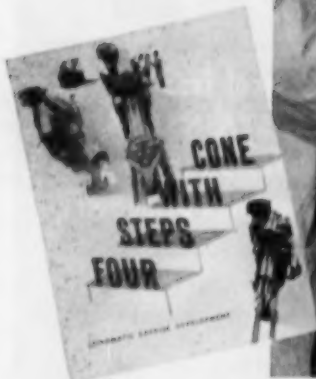
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First with NEW "Automatic" Service

Cone was the first builder of multiple spindle automatics to provide machine users with an experimental service in the application of carbide tools.

This service is a practical means of determining the possibilities of carbide tools for production men without loss or interference with their regular production schedules.

A pamphlet "FOUR STEPS WITH CONE" describes this service. Send for your free copy.



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

Plans Expansion

LeTourneau-Westinghouse builds factory in Peoria, broadens operations at other points

AN EXPANSION program costing an estimated \$9 million has been launched by LeTourneau-Westinghouse Co., Peoria, Ill., maker of earthmoving and material handling equipment.

Major project will be construction of a 300,000-sq-ft factory building to adjoin the site of one of the plants in Peoria. Cost of the building and tooling will be more than \$3 million. Completion is scheduled for Apr. 1, 1957.

Simultaneously, the company is expanding its plant operations at Toccoa, Ga., and Indianapolis.

Capacity Doubled — The additional building space and machine tools will provide more than double the productive capacity of the firm since its organization in 1953. At Peoria alone, the productive capacity will be increased to more than 150 per cent of that available when the company was formed.

The new Peoria factory will contain facilities for processing rubber-tired earthmovers — from cutting of steel through machining, heat treating and final assembly, plus testing facilities. Machine tools and equipment having a total cost of \$2.5 million have been ordered and will be delivered beginning in December this year.

Mesta To Build J&L Mill

Mesta Machine Co., Pittsburgh, received a contract to furnish a 44-in. semicontinuous hot strip mill for Jones & Laughlin Steel Corp.'s Aliquippa (Pa.) Works. The contract covers buildings, foundations, electrical equipment, cranes, furnaces, piping and auxiliary equipment.

The mechanical equipment will include a slab and bloom shear for the slabbing mill department, alterations to the bar and billet mill transfer and tables, hot strip mill universal reversing roughing stand, rotary crop shear, scale breaking stand, vertical edging mills, six hot strip mill finishing stands, downcoilers, with transfers, pilers, un-pilers and conveying tables.

The new mill will be designed to hot roll steel up to 38 in. wide which will be delivered to the five-stand tandem cold mill for rolling into tin plate stock. The new mill also will roll hot strip for fabrication of electrical welded pipe, skelp for continuous butt welded pipe and barrel stock.

Hewitt-Robins Gets Contract

Hewitt-Robins Inc., Stamford, Conn., received a contract for a 7100-ft conveyor system to be installed in U. S. Steel Corp.'s new ore screening and sintering plant at Youngstown. Installation will be completed early in 1957 and will cost more than \$1 million.

Towmotor May Buy Gerlinger

Towmotor Corp., Cleveland, has made an offer to purchase Gerlinger Carrier Co., Dallas, Ore. Gerlinger makes straddle-type industrial trucks and lift trucks.

Ryerson Division Renamed

Joseph T. Ryerson & Son Inc., Chicago, changed the name of its Ryertex-Glyco Division to Industrial Plastics & Bearings Division. J. L. McDermott is manager of the division; H. J. LeBeck, assistant to the manager.

Pattern Shop To Close Sept. 4

Kearney & Trecker Corp., Milwaukee, will shut down its pattern shop Sept. 4 and rely entirely on job shops. The machine tool firm does not operate a foundry. It plans to sell plant No. 2, which houses the pattern shop, some production facilities and has been used for warehousing and rental to outside interests.

Cincinnati Shaper Expanding

Cincinnati Shaper Co., Cincinnati, will construct additional manufacturing, administration and engineering facilities at its Whitewater shop. The building is scheduled to be completed early in 1958 and will add about 180,000 sq ft to the shop. The company plans to consolidate all of its operations at its Whitewater location. Lodge &

ShIPLEY Co. will acquire the Hopple street real estate of Cincinnati Shaper early in 1958.

Stearns Magnetic Sells Line

Indiana Steel Products Co., Valparaiso, Ind., purchased the magnetic and separator business of Stearns Magnetic Inc., Milwaukee. The plant at 635 S. 28th St., Milwaukee, will operate as Stearns Magnetic Products, a division of Indiana Steel Products. Its products include pulleys, lifting magnets, part separators, drums, metal detectors, and concentration and beneficiation equipment.

Stearns Magnetic's transmission group (brakes, clutches and clutch-brakes) will be made by Stearns Electric Corp. which will be located at 120 N. Broadway, Milwaukee, after Oct. 1.

To Build Tube Mill in Canada

Calumet & Hecla Inc., Chicago, established a wholly owned subsidiary, Calumet & Hecla of Canada Ltd., at London, Ont. A seamless, nonferrous tube mill will be built. Estimated costs: \$2.5 million for land, buildings and improvements for the new mill; \$3.5 million for machinery and equipment; \$1,250,000 for working capital. Construction is scheduled for completion prior to Dec. 31, 1957. Operating and manufacturing practices of the new plant will be directed by Wolverine Tube, the fabricating division of the parent firm.

Opens Titanium Warehouse

Titanium Metals Corp. of America, New York, opened a warehouse at 6465 Corvette St., Los Angeles. Titanium is being bought by West Coast airframe and missile fabricators. Ready availability of warehouse stocks is expected to accelerate a number of nonmilitary experimental applications in the marine, chemical and refining industries in that territory. Titanium Metals, owned jointly by Allegheny Ludlum Steel Corp. and National Lead Co., recently announced a 67 per cent expansion in titanium sponge and ingot melting capacity and expansion of mill processing facilities. The firm has purchased a \$3-million Sendzimir

mill for precision rolling of wide sheet.

J. M. Tull Erects Warehouse

J. M. Tull Metal Supply Co., Atlanta, is erecting a warehouse in Birmingham for storage of stainless and hot-rolled steel, aluminum, nickel, copper and brass.

Dresser Mfg. To Build Plant

Dresser Mfg. Division, Bradford, Pa., one of the Dresser Industries, will build a million-dollar plant in Wellsboro, Pa., for the production of couplings and pipe fittings.

Interlake Buys Globe Iron

Acquisition of Globe Iron Co., Jackson, O., by Interlake Iron Corp., Cleveland, has been completed. Interlake also acquired over 80 per cent of the outstanding shares of Globe Metallurgical Corp., Beverly, O.

Detroit Broach Renamed

Detroit Broach Co. Inc., Detroit, changed its name to Detroit Broach & Machine Co.

Ulbrich Enlarges Facilities

Ulbrich Stainless Steels, Wallingford, Conn., added 15,000 sq ft to its plant for warehousing coils. Plant equipment has been modernized and expanded with the addition of new mills and a gas-fired atmosphere bright annealing furnace. The firm has facilities for rolling, slitting, shearing, flattening, edge rolling and annealing.

Boosts Air Conditioner Output

Chrysler Corp.'s Airtemp Division, Dayton, O., is enlarging its air conditioner production facilities with the addition of a \$1.5-million machine line. It is expected to be in operation the latter part of August when Airtemp will start manufacturing three new air conditioner compressors: One for the company's car air conditioner and two hermetically sealed compressors for home air conditioning units. As part of the over-all expansion step, the com-

pany is installing also a pair of automatic coil making machines which will turn out car air conditioner cooling coils.

Buyers Air Conditioning Line

The Air Conditioning Division of Union Asbestos & Rubber Co., Chicago, has been transferred to National-U. S. Radiator Corp., Johnstown, Pa. The principal acquisition in the transfer is a manufacturing plant at Greenville, Ill.

Pipe Mill Work Progresses

Alberta Phoenix Tube & Pipe Ltd. expects to begin operations this fall in its new pipe mill in Edmonton, Alta. It will have an initial annual capacity of 75,000 to 100,000 tons of finished pipe.

Builds Oxygen Converter Plant

Kaiser Steel Corp. is building an oxygen converter plant at Fontana, Calif., under license from Kaiser Engineers, Oakland, Calif. The latter firm acquired the exclusive U. S. rights to the process in 1954 from Brassert Oxygen Technik A. G., Zurich, Switzerland. This project is part of Kaiser Steel Corp.'s \$113-million expansion program which will boost its annual steel production by about 40 per cent.

Boosts Titanium Production

First of five new titanium melting furnaces went into operation last month at Mallory-Sharon Titanium Corp.'s plant in Niles, O. This is a major step in the company's \$4.5-million expansion program which will double present capacity by 1957. Mallory-Sharon's output of titanium mill products is estimated at 1500 tons in 1956 and 3500 tons in 1957. "By 1960," says J. A. Roemer, president, "we expect to produce 1000 tons of mill products per month." When the last of the new furnaces is placed in operation during the first quarter of 1957, melting capacity will be 500 tons a month. Presently, 90 per cent of titanium mill products are earmarked for military aircraft and other defense needs; 10 per cent for use in the commercial market.



ASSOCIATIONS

American Society for Metals, Cleveland, nominated these candidates for the 1956-57 term: Dr. D. S. Clark, professor of mechanical engineering, California Institute of Technology, Pasadena, Calif., president; G. M. Young, technical director, Aluminum Co. of Canada, Montreal, Que., vice president. C. H. Lorig, assistant director, Battelle Memorial Institute, Columbus, O., continues as treasurer. A. O. Schaefer, director of research, Midvale-Heppenstall Co., Philadelphia, retiring president, becomes a trustee. As secretary of the organization, W. H. Eisenman, Cleveland, was selected for his twentieth two-year term. The announcement was made by C. D. Post, vice president of Carpenter Steel Co., Reading, Pa. The new officers will be inducted during the 38th annual National Metal Exposition and Congress, Oct. 8-12, Cleveland.



REPRESENTATIVES

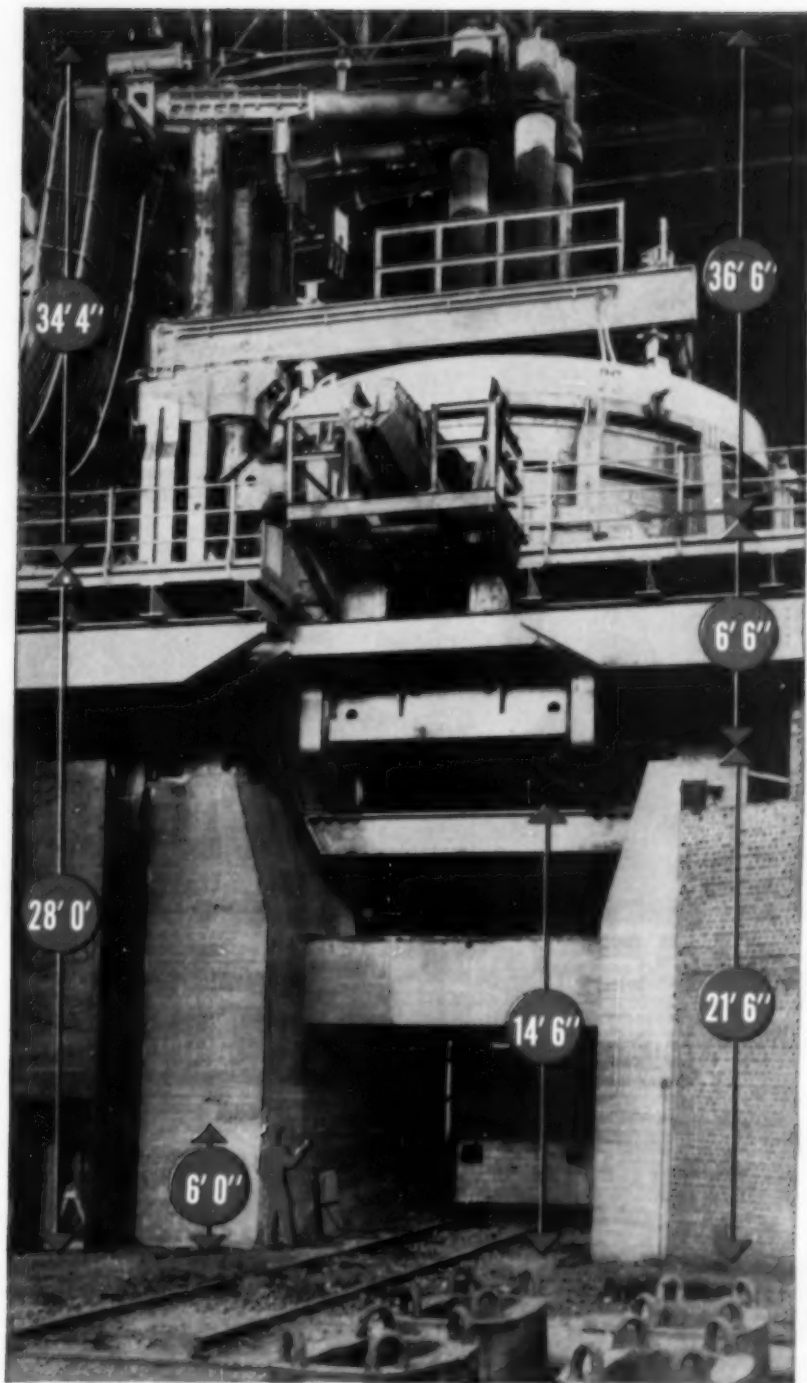
Thomson Electric Welder Co., Lynn, Mass., appointed Arthur B. Sonneborn Co., Detroit, to handle its welding equipment in Michigan and northwest Ohio.

American Forge & Mfg. Co., McKees Rocks, Pa., has been appointed distributor of large nuts manufactured by Jos. Dyson & Sons, Cleveland.

Republic Steel Corp., Cleveland appointed Huron Steel Co., Detroit, a distributor of its cold-finished stainless steels in that area.

Conco Engineering Works, Mendota, Ill., appointed Burgess Sales Co., New York, as distributor for its crane and hoist lines in that area.

Reynolds Metals Co., Louisville, appointed Bethlehem Aluminum Inc., Bethlehem, Pa., distributor of its architectural aluminum. The company is also a distributor for Reynolds Building Products Division.



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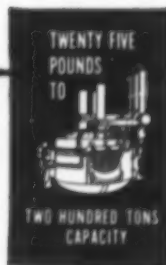
Manufactured in . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . .
 BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao
 . . . ITALY: Forni Stein, Genoa . . . JAPAN: Daido Steel Co., Ltd., Nagoya

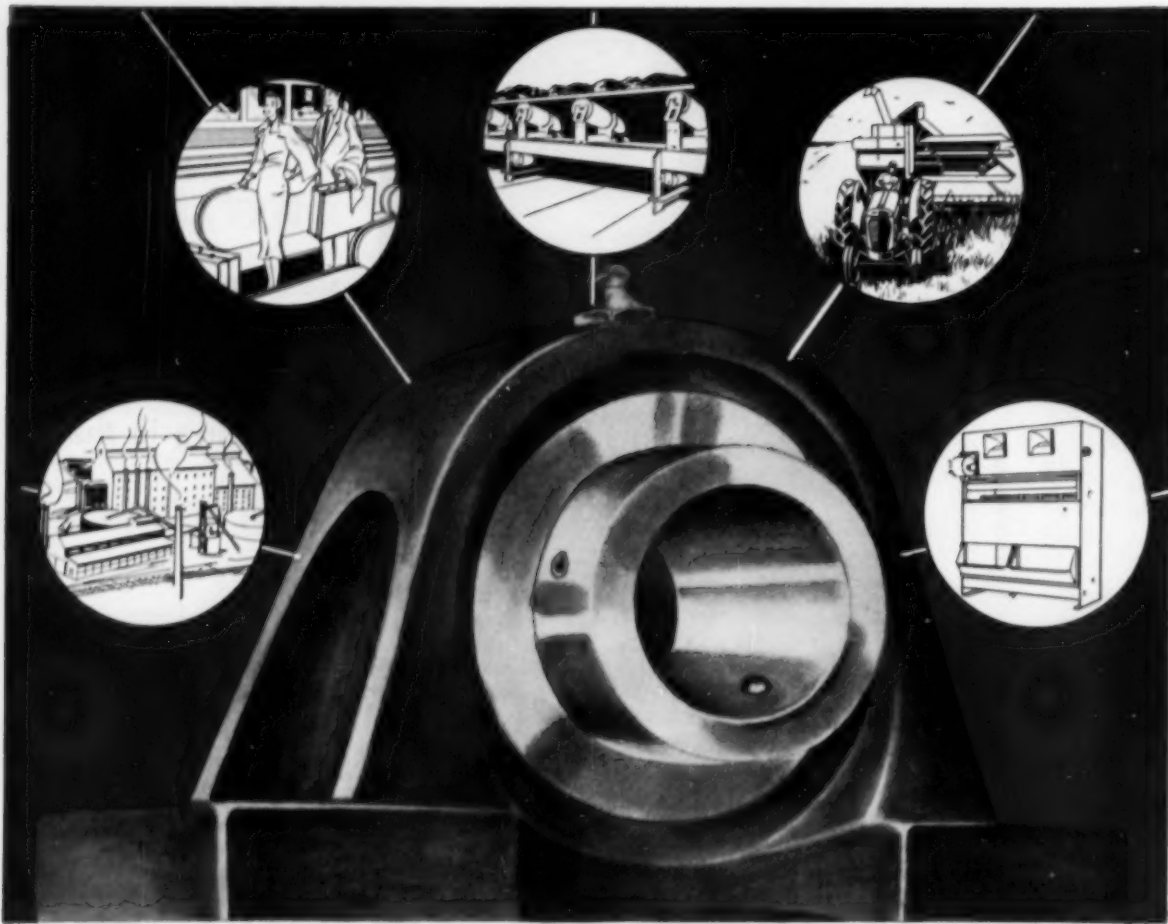
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Stress Relief Test for Titanium

RC 130A

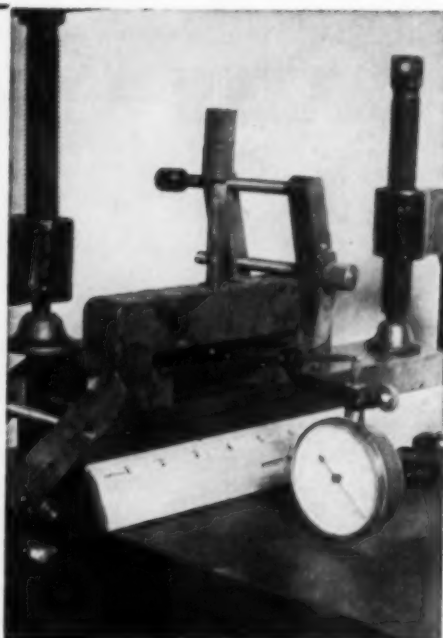
	400°F	600°F	800°F
Initial Deflection	0.100-in.	0.100-in.	0.100-in.
Initial Set (Yield Strength)	0.010-in.	0.009-in.	0.010-in.
Final Set	0.038-in.	0.050-in.	0.092-in.
Stress Relief	40%	55%	100%

RC 130B

Initial Deflection	0.110-in.	0.115-in.	0.115-in.
Initial Set	0.010-in.	0.010-in.	0.012-in.
Final Set	0.038-in.	0.042-in.	0.090-in.
Stress Relief	30%	40%	90%

Ti 150A

Initial Deflection	0.200-in.	0.200-in.	0.200-in.
Initial Set	0.013-in.	0.010-in.	0.015-in.
Final Set	0.042-in.	0.090-in.	0.170-in.
Stress Relief	22%	47%	92%



This is the beam loading fixture and setup used at the U. S. Naval Gun factory. The sample at the center is loaded, and the dial indicator shows the amount of deflection. Test data were obtained with this equipment

Stress Relief Test for Titanium

A SIMPLE TEST reveals the effect of heat treatment on titanium. It takes the guesswork out of finding internal stresses and guards against one of titanium's weaknesses: Delayed cracking.

Loading—The test is a simple beam loading of a sample. By measuring deflection, initial and permanent set, you can determine the amount of stress relief.

For tests at the U. S. Naval Gun Factory, 3/16-in. cold-rolled strip was used. Test pieces measured 3/4 x 4 in. The simple fixture and setup shown in the illustration stressed the sample. An Ames indicator, graduated in 0.001-in., measured the amount of deflection at the center.

Procedure—A sample is placed in the fixture and the loading screw turned down until it contacts the center of the strip. The

By HAROLD BERNSTEIN
and
EUGENE A. GOUGH,
U. S. Naval Gun Factory,
Washington

screw is turned to a trial setting, then backed off. This is repeated, increasing the deflection and load until a permanent set of 0.010-in. is obtained with no load—a practical method of determining the yield point of the test piece.

The sample is again stressed by turning the screw back to the final (Ames) indicator reading. The entire fixture is placed in a circulating air furnace for 1 hour, removed and air cooled.

After cooling, the screw is backed off and the set measured.

The per cent of stress relief can be calculated from the data: Initial set (yield strength) divided by the final set (yield strength deflection) times 100.

There should be no change in the hardness of the test pieces. The samples used here were checked before and after the heating cycle.

Results—The data show that as the temperature is increased from 400 to 800°F there is increasing stress relief. The RC 130A alloy is completely relieved at 800°F; the other two are only 90 per cent relieved at that temperature. The RC 130B responds less than the Ti 150A alloy, since aluminum increases the high temperature strength of titanium.

Alloys tested contained many of the elements used in the newer grades. This procedure can be applied to other alloys.



CO₂ Speeds Coremaking

Cores and molds made with a mixture of sodium silicate and sand harden in seconds when CO₂ gas is passed through them. The gas combines with sodium silicate, the binder, to form a silicic acid gel which cements the sand grains together. Cores and molds can be poured off immediately

FOUNDRYMEN are cheering the CO₂ process, the latest in a line of developments that is remolding the industry. Here's what they say:

Corebaking is eliminated—large general foundry.

CO₂ gives us a more accurate core—aluminum foundry.

Cleaning time reduced 15 per cent—gray iron foundry.

No more core blows—gray iron jobbing foundry.

Cores shake out easier—aluminum foundry.

We've reduced our scrap due to cracks—steel foundry.

Rat tails eliminated—gray iron foundry.

Progress—There is little new in the process until the sand reaches the coremaker's bench. He finds that the sand needs less ramming. He soon learns that the number of rods and wires used in making cores can be reduced drastically.

Next comes the new operation and big advantage of the process.

After the core is made, the coremaker takes seconds to save hours. He passes carbon dioxide gas through the core. It hardens immediately and is ready to be used. Eliminated are baking cycles lasting from an hour or two to overnight.

Fact and Forecast—Liquid Carbonic Corp., Chicago, estimates that each day one or two foundries switch over to CO₂. Roy J. Carver, president, Carver Foundry Products Co., Muscatine, Iowa, expects the process to win out over the foundrymen's traditional conservatism. He estimates: "In three years, 80 per cent of the foundries will be making 80 per cent of their cores by the CO₂ process." He predicts tremendous growth in the next year, with a swing to the process by the big production foundries.

At present, small foundries have taken the lead in adapting the process to their operations.

Examples—Ottumwa Foundry

Co. Inc., Ottumwa, Iowa, is a jobbing foundry pouring 10 tons of gray iron a day. Laurence Leddom, vice president, says two coremakers now do the work that kept four coremakers and two oven tenders busy. Ottumwa now makes 65 per cent of its cores with CO₂. Its plans call for 100 per cent conversion.

R. J. Parsons, foundry superintendent, Worthington - Gammon Meter Division, Worthington Corp., Newark, N. J., states: "The savings are in labor and storage space. We don't have any storage space at all now; in fact, we closed down our core shop. We moved three blowing machines down by the molding stations, and our core shop is used for pattern storage."

Aluminum Co. of America, Cleveland, says the process is what jobbing foundries need to get the accuracy on short runs that the highly mechanized shops get on production runs. They use cores in

What To Expect from CO₂

ADVANTAGES

- Time and costs of core baking are eliminated
- Accuracy is increased
- Investment in such capital equipment as core ovens, dryers and plates is not necessary
- Storage space needs are eliminated or greatly reduced
- Scheduling is simplified; transportation costs are reduced
- Rush orders can be placed in production immediately—no waiting for cores
- Cores formerly made in halves can be made in one piece. Rubbing, gaging, pasting and mudding are eliminated
- Use of core rods and wires is reduced
- Amount of sand used can be cut by using arbors to make hollow cores
- Obnoxious fumes from burning cores are eliminated
- Little capital outlay is needed to start the process. Existing equipment—coreblowers, mullers, sand slingers, etc.—can be used

DISADVANTAGES

- Sand mixtures dry when exposed to the air
- Sands used must be dry and cool, contain no clay or pan fines
- Coreboxes must be in good condition with generous drafts to allow cores to be removed
- Fast withdrawal of gas causes CO₂ cylinder valves to freeze
- Overgassing causes cores to become friable
- Conventional core tests are not applicable. Test data and scientific information are incomplete

30 minutes to an hour after they are made. A lot of cores which once had to be made in two boxes and then pasted together are now made in one box.

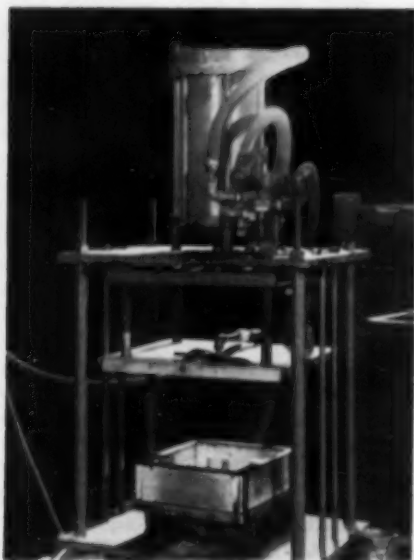
Orville Arendt, coreroom foreman, State Foundry & Machine Co., Cedar Grove, Wis., says: "We make all large cores, from 15 to 1300 lb, with CO₂. As soon as we can, we will use the process to make the small ones. We find casting surface is better and shakeout is at least 50 per cent easier."

Oberdorfer Foundries Inc., Syracuse, N. Y., says cost studies show the CO₂ process compares favorably with conventional processes. It finds that sulphur added to the cores makes them suitable for casting magnesium.

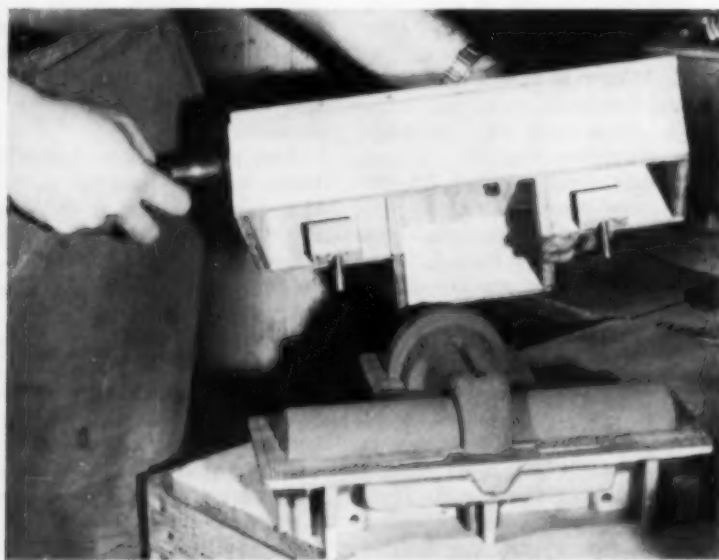
Beginning—Use of sodium silicate as a binder is not new to foundrymen. What is new is the use of CO₂ gas for quick hardening and the addition of substances to the binder to give the collapsibility needed for foundry use.

Germany and Great Britain have pioneered in the application of the process, and apparently Iron Curtain countries are not strangers to its use.

Formulas—Hans J. Heine, technical director, American Foundrymen's Society, says sodium silicate



While Mohawk Foundries Inc., Cleveland, is gassing one core in this fixture, another core is being made on a coreblowing machine. No time is lost in gassing



At Cooper Alloy's foundry, cores are hardened immediately after being blown by placing a chamber over the soft sand and allowing CO₂ gas to flow into the core and out through vents in the corebox. Big potential of the process, says Cooper Alloy, is in production runs of small cores

used as a sand binder must have a ratio of 1:2.5 to 1:2.6 of Na_2O to SiO_2 . Mohawk Foundry Inc., Cleveland, finds a mixture of 8 lb of sodium silicate and 300 lb of sand, plus 1 per cent Gilsonite and 1 per cent fly ash, gives aluminum castings good shakeout properties.

Proprietary sodium silicate binders are designed for proper collapsibility. Their ingredients, other than sodium silicate, are not known but usually include a soluble organic substance, possibly some type sugar.

First Step—The quality of a core depends on the sand used to make it. CO_2 cores are no exception. They should be made from a washed and dried silica sand that contains no pan fines or clay.

For best results, sand temperature should be around 70°F. Cold sands thicken the binder which causes difficulty in mixing and in proper coating of sand grains. Sand over 100°F dries out quickly and drives moisture from the binder, which results in weaker cores.

Existing sand mullers can be used to mix the sand, but care must be taken to avoid aerating or heating the sand.

A finer sand than that used for oil cores can be used because of

the greater permeability of CO_2 cores (sometimes it is required to avoid metal penetration).

Binders—Several companies sell binders ready-mixed for foundry use. It is important to realize that these binders are not all alike. Sodium silicate binders can be compounded for varying conditions.

Binders should be stored at room temperatures before they are used. Cold temperatures do not harm the binder, but they make it viscous and difficult to pour. Containers must be kept closed because the silicate reacts slowly with the CO_2 in the air.

Core Sand—Sand mixed with sodium silicate can air harden by combining with the CO_2 in the atmosphere. In transporting the sand, it is best to use a closed container, or to cover the sand with moist burlap bags. These methods, says Foundry Services Inc., Columbus, O., maker of Fosco binder, keep sand over the week end.

Sand for coremakers should be stored above the area where they harden the cores because CO_2 is heavier than air.

It is important to clean mixers, coreblowers and tools after use because CO_2 sand air hardens. Warm water gives good results.

Coremaking — The high flowability of CO_2 sand reduces the amount of ramming needed. Because cores are hardened right in the box, the need for rods and wires is reduced and accuracy is increased. On many jobs, the use of arbors to hollow out cores results in big savings in the amount of sand used.

To make it easy to remove the core, the coremaker should rap the box before gassing.

Gassing — The important thing in gassing is to make sure that CO_2 reaches all parts of the core. If sand sticks to the box, it indicates that gassing was uneven or insufficient. Vents should be placed to assure even gassing.

It is better to undergas than to overgas. Undergassed cores will continue to gain in strength by picking up CO_2 from the atmosphere. Many foundries save on gassing costs by using only enough CO_2 to set up the core, then letting it harden further in air. Strength of cores may increase 100 per cent in 2 hours after gassing.

Overgassing makes cores weak and friable and is recognizable by a white frosted surface. Timing devices are useful in preventing overgassing. Average time for gassing is about 15 seconds.

There are several ways to inject CO_2 into the cores. Simplest are the lance and gassing cup methods. In the lance method, illustrated page 114, a section of 1/4-in. copper tubing is connected to the CO_2 supply. After the sand has been rammed into the corebox, a rod is used to make a hole that extends to within a few inches of the bottom. The lance is inserted and CO_2 turn on. Larger cores are hardened by repeating the procedure.

The use of the gassing cup is equally simple. Its main use is for coreboxes open at both ends.

For Speed—The pressure plate method puts CO_2 hardening on a production basis. The gas is forced down into the core from a pressure chamber created by a metal or wood plate or chamber placed on top of the corebox or mold flask. The pressure chamber (the space between the top surface of the core and the plate) is constantly being filled with the CO_2



From 75 to 80 gear segments are made each day by Riverside Foundry, Bettendorf, Iowa, for a leading earth moving equipment manufacturer. Two CO_2 -hardened halves are assembled to make a mold weighing 750 lb. Accuracy of the process has eliminated the machining of gear teeth



Cooper Alloy Corp., Hillside, N. J., has introduced the CO₂ process into its stainless steel foundry. The 200 lb core shown here was previously made in halves with an oil sand. Each half was baked for 8 hours. Now, gassing in two locations for 20 to 30 seconds at 30 psi hardens the core. Coremaking time is reduced from 75 to 25 minutes and rodding is reduced 60 per cent

gas. Vents in the bottom of the box allow the gas to force out air which would interfere with complete hardening.

Coreboxes also can be equipped for the introduction of CO₂ from the bottom.

Cores hollowed out with arbors can have the gas introduced through the arbors.

Some silicate binders have sufficient green strength to allow for still other ways of gassing. Cores made from these binders are turned over into a dryer or core plate. Another core is made by the coremaker or coreblower while CO₂ gas hardens the core in the dryer

or on the core plate.

CO₂ Supply — There are four types of supply systems. P. F. Droste, manager, Carbon Dioxide Division, National Cylinder Gas Co., Chicago, gives these rules of thumb for selection:

Standard 50-lb interchangeable cylinders are most practical for foundries using 50 to 500 lb of CO₂ a week. Dry ice converters and high pressure systems are permanent installations for users of 500 to 2000 lb a week. The low pressure unit consisting of a 6000-lb capacity storage tank is recommended for users of 100,000 lb a year and over.

Fast withdrawal of CO₂ will freeze up bottle valves. Use of several bottles on one line, heaters and special valves will eliminate freezing.

Core Properties—Louis J. Pedicini, foundry supervisor of General Motors' Process Development Section, says: "Standard American Foundrymen's Society core sand tests for collapsibility and gas evolution do not seem to give an accurate indication of the properties of CO₂ cores. Other tests indicate that CO₂ cores have lower tensile strength, higher permeability and about the same hardness as oil-bonded cores. CO₂ cores are more friable, but are less likely to cause blow defects."

The higher friability of CO₂ cores has had little, if any, effect on their adoption, probably because they need less handling.

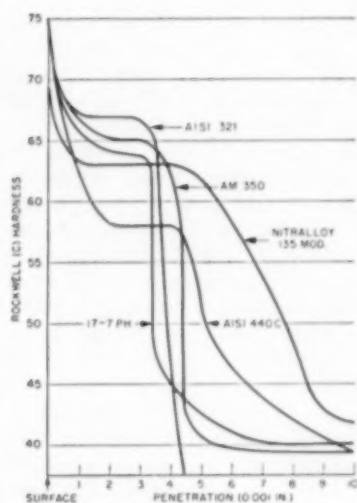
Collapsibility — Carver Foundry Products, maker of Steinex binders, recommends the use of coal dust or asphalt binder to increase core collapsibility and 2 per cent of iron oxide to eliminate the need for core washes.

National Cylinder Gas Co. lists other carbonaceous additives to improve collapsibility: Dextrins, crushed corn cobs, charcoal, sea coal and wood flour.

For extremely difficult shakeout problems, Carver recommends: 1. Use the lowest possible percentage of binder. 2. Use a coarser sand. 3. Add 1 to 2 per cent iron oxide, or 80 AFS sea coal, or both. 4. Shake out the core with high pressure water.

Re-use — Thomas E. Barlow, sales manager, Eastern Clay Products Department, International Minerals & Chemical Corp., Chicago, maker of DonCO₂ binder, says: "CO₂ core sands can definitely be reclaimed, if they were not used under circumstances which converted all the sodium carbonate to an insoluble form." In most applications, he says, washing, wet or dry reclamation, or dry scrubbing is a complete success.

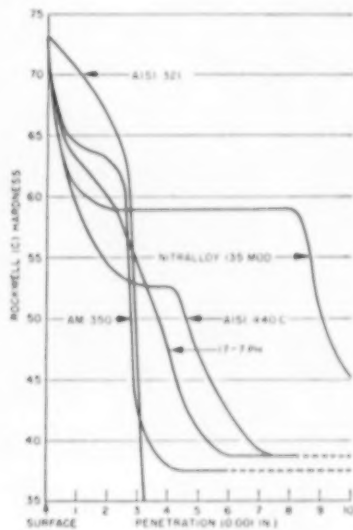
* An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O. No. 4 in STEEL's Production Ideas series (Sept. 3) will be on short run stampings.



HEAT TREATMENTS BEFORE NITRIDING

AISI 321	Annealed
AM 350	1700°F Water Quench
	-100°F 2 hr
	850°F 2 hr
17-7 PH	1400°F 90 minutes
	1050°F 90 minutes
AISI 440C	1875°F Oil Quench
Nitralloy	1725°F Oil Quench
	1100°F 2 hr

Note: Surface hardness measured on Vickers hardness tester with a 1 kilogram load. Other measurements from a Tukon with a 250 gram load and a Knoop indenter.



Typical hardness gradients in the five stainless types tested at Boeing. Left: 975°F for 48 hours; Right: 1025°F for 20 hours

Cheaper Case for Stainless

Nitriding with liquid salt leaves a 0.00035-in. case that is reported to be VHN 1355 (Vickers) hard. Boeing Airplane Co. says it's simpler and less expensive

YOU don't have to rely on gas nitriding to put a case on stainless steel. Although it's only half as thick, you can get a serviceable hard surface from the less expensive liquid salt nitriding.

Boeing Airplane Co., Seattle, set out to find a cheaper nitriding method. H. A. Johnson, one of its research engineers, says that the liquid salt bath is simpler and uses less expensive equipment.

Here are Boeing's conclusions:

1. Liquid salt nitriding is a simple, effective way to put a thin, hard surface on stainless steel.

2. Case thicknesses are about half those formed during an equal exposure in ammonia gas.

3. The salt bath produces cases that are VHN 1355 hard, up to

0.0035-in. thick and resist oxidation up to 600°F (possibly higher).

4. A nickel plate 0.001-in. thick is effective in masking those areas where nitriding isn't desired.

Inside Story—Many industrial applications need a material that is hard outside and temperature-tough inside. Salt bath nitriding gives those qualities to both.

Boeing used a proprietary salt (Liquid Heat #720) to case harden AISI 321, 440C, AM 350, A-286 and 17-7 PH. Nitralloy 135 Modified was run as a comparison.

Process—The surfaces of the samples were prepared by degreasing and buffing. Samples were suspended in the unagitated salt bath. Time ranged from 2 to 72 hours; temperatures were 975 to



K700 Nitral etch

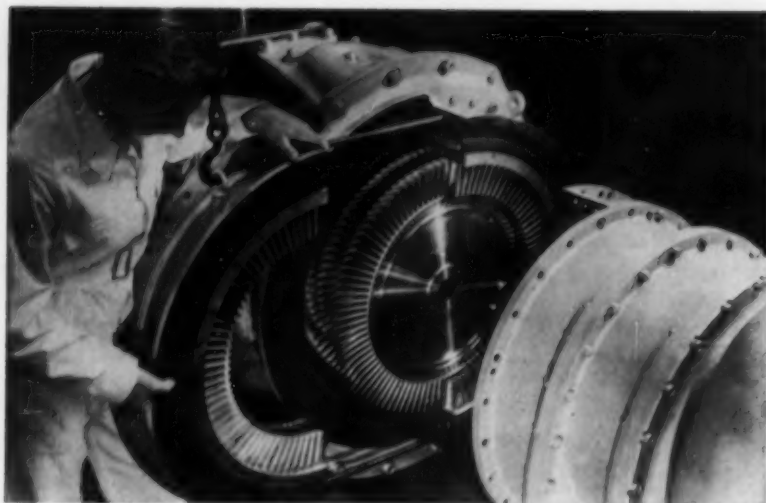
Photomicrograph of AISI 321, nitrided at 1025°F in liquid salt. Knoop indentations are 0.001-in. apart

1050°F. After an air quench, parts were rinsed in water, which was kept basic to prevent the formation of HCN.

Generally, the samples of 17-7 PH had thicker cases than those that were heat treated—nitrogen diffuses more readily and is more soluble in austenite.

Growth of the samples varied slightly. In all cases it was less than 0.0005-in. and averaged 0.0002-in. per surface for a nitriding period of 24 hours at 975°F.

Resistance to air oxidation was checked on two samples of AISI 321 at 600°F and two samples at 800°F. There was no change in the 600°F samples after three cycles of 4 hours each; the 800°F samples grew 0.00015-in.



Easy maintenance is typified by ready accessibility of turbine and stator

Gas Turbine Makes U. S. Debut

An 1130 bhp gas turbine of English design has become available to American industry. Its light weight and small size give it a host of application possibilities

INDUSTRY has another light power source. Clark Bros. Co., Olean, N. Y., one of the Dresser Industries, has introduced a gas turbine that develops 1130 bhp.

It's a natural for driving stationary or portable power generators and compressors. Known as the Mark TA, the unit has the variable speed and high starting torque characteristic of two-shaft turbines.

Double Work—A relatively modest efficiency of 15 per cent can be increased when the gas turbine is used in processes where the exhaust energy can be utilized, as in a steam boiler.

The ability of the turbine to reach full load from a cold start in less than 2 minutes (it took 1 minute 47 seconds in a test demonstration) makes it valuable as an emergency power generating unit.



Cut-away view of the Clark Mark TA gas turbine

Its light weight (6 tons) and small size permit it to be installed in close quarters.

Specifications—The Mark TA operates on a simple, open cycle. It is a dual-shaft, series flow unit which develops 1130 bhp at 80°F and 1000 ft above sea level.

Output turbine speed is 6000 rpm. Reductions or increases in speed are made through gearing.

Operation — Combustion air is supplied by a 13-stage, axial flow compressor which is coupled to the high pressure turbine. It turns at about 11,500 rpm. Fuel is combusted in an elbow-type chamber with a single burner.

Two turbines are used: A two-stage high pressure unit drives the compressor; a two-stage low-pressure unit drives the output shaft. The blades, which are made of Nimonic 80A, are anchored to stainless steel discs by broached, fir-tree type serrations.

Cooling—Blading of both compressor and stator are designed on the free vortex principle. Stator blades are mounted in 12 segments which can expand without disturbing the outer casing.

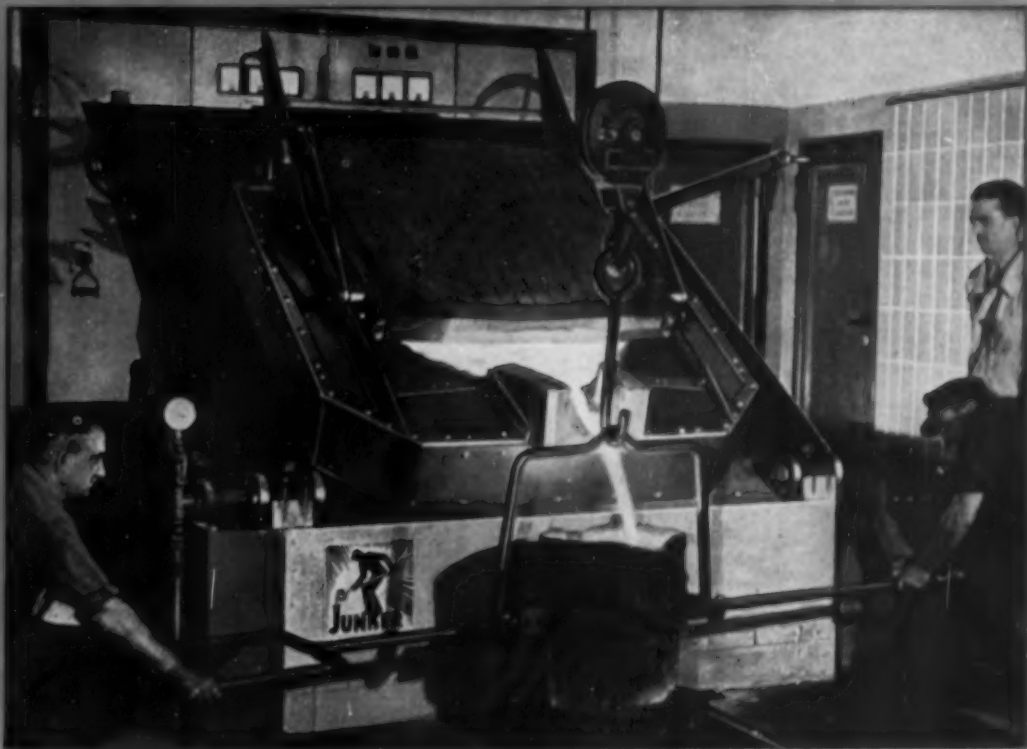
The outer casing, blade roots and discs are cooled by air from the axial compressor. Turbine or stator blades can be inspected within 1 hour after shutdown.

Starting—Turning a handwheel starts the unit. In the first step, auxiliaries, such as the lube oil pump, start up. Then a 24-volt, direct-current motor, powered by batteries, turns the compressor.

In subsequent steps, a pilot flame is lighted in the combustion chamber, burning fuel and air bring the speed up to 5000 rpm where the starter motor disengages, the high-pressure turbine continues to accelerate to its idling speed of 6000 rpm where the governor and engine-driven auxiliaries take over.

Development — Basic design of the turbine was developed in England in 1946, and modified in 1949. Clark Bros. Co. will manufacture and sell it in this country through an agreement with Ruston-Hornsby Ltd., Lincoln, England.

The unit will sell for \$110,000, approximately \$100 per horsepower. First U. S. made units will be available in December, 1956, and January, 1957.



A NEW METALLURGICAL TOOL FOR THE PRODUCTION OF HIGH QUALITY CAST IRON

We offer to the American industry the AJAX-JUNKER 60 Cycle induction furnace for the melting and superheating of cast iron, and particularly for the production of ductile cast iron. The AJAX-JUNKER furnace is economical in foundries with intermittent operation and frequent alloy changes. It melts loose turnings with high recovery, and can

easily operate at the high temperatures required for desulphurizing. Controlled stirring of the molten metal speeds up recarburizing rate and solution of alloy ingredients.

The photograph shows a Junker coreless induction furnace for melting and superheating cast iron in a German foundry.

For further information write to

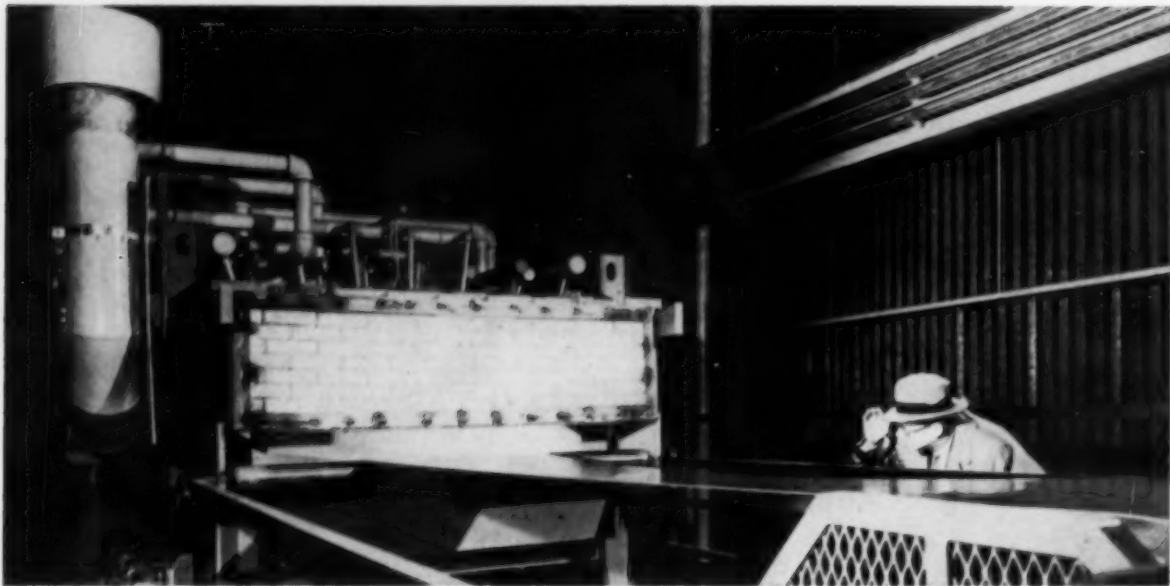
AJAX
TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.



INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northup High Frequency Induction Furnaces
AJAX ELECTRIC CO., The Ajax Hydrogen Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting



The first operation: Clean the sheet surface. This flame heating furnace removes surface oils by oxidization. Sheet then passes to reducing chamber

Continuous Strip Gets Tight Coat

The continuous strip mill at J&L incorporated the experience gained from 25 others already operating. Results: Better adherence, good forming properties, attractive appearance

CAREFUL CONTROL over all stages of production. That's what Jones & Laughlin Steel Corp., Pittsburgh, credits for the tight, uniform coating on the sheet from its new \$6,250,000, hot-dip galvanizing line.

The new line benefits from approximately 25 continuous galvanizing lines already in operation. Experience in those lines led to control improvements which were incorporated into the J&L unit.

Getting Better—The plant contains these improvements over the earliest lines in American mills: Improved mechanical equipment at the entry; a slightly larger cooling capacity after annealing, and better control of zinc bath temperature.

The mill has three parts: Entry, where the cold-rolled steel bands are welded; normalizing or

annealing section which ends with the zinc bath; the shearing and delivery section.

First Section—At the entry, two payoff reels feed coils to lapwelding equipment. Surface of the base metal is oxidized to remove lubricants or rust preventives. This is done continuously by a furnace.

Annealing follows oxidation. After passing through annealing and cooling, the strip enters a zinc bath which also seals the end of the cooling furnace. Rate of cooling is carefully controlled in a non-oxidizing atmosphere, otherwise oxygen in the furnace atmosphere would re-oxidize the strip, spoiling its wetting characteristics.

Bath—In the flux-free molten zinc bath, wetting and bonding occur instantly. The strip then passes overhead through a large cooling duct which brings hot coat-

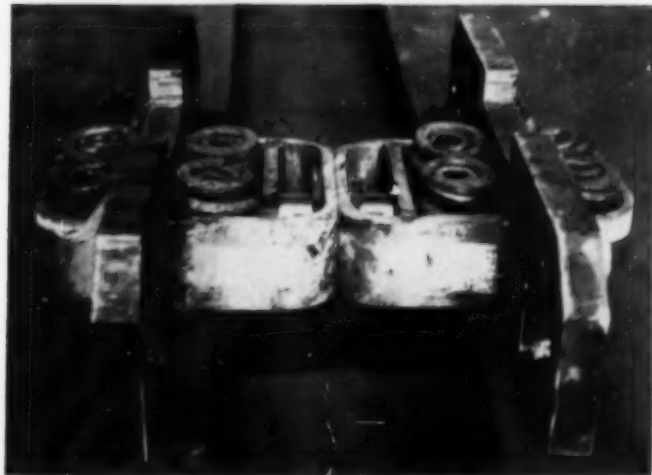
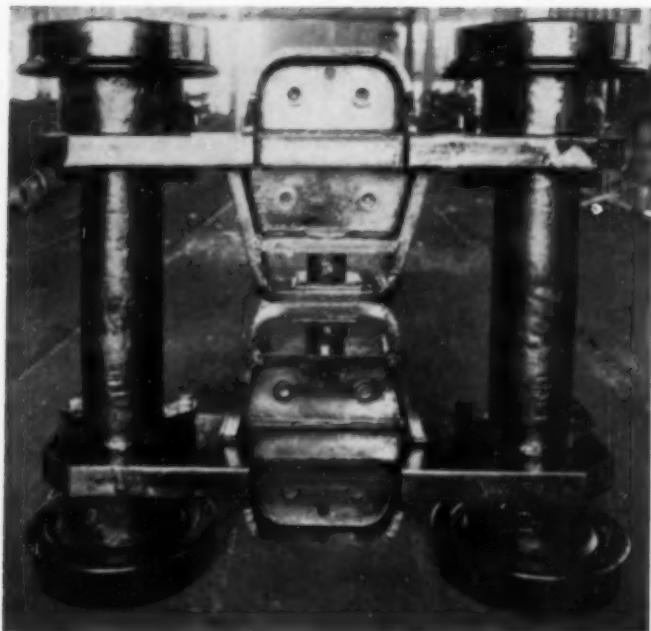
ed strip from 900°F to room temperature.

At the delivery end, steel is shipped as coil or sheet. There are two tension reels for coiling. A coil conveyor carries out the coils, which can be transported to the shipping dock by overhead crane or lift truck. If shipped in sheet form, strip by-passes coil conveyors, is cut to length by a flying shear and then piled at the exit end.

Better Equipment—Among the better features of the new mill is improved equipment design, based on operations at previous galvanizing mills.

It has incorporated a control to prevent yanking strip.

The heart of the operation, the zinc bath, has temperature controls that insure J&L getting a uniform, tight zinc coating. Strip en-



Top: Truck assembly. Center: Side frame and spring nest assembly. Bottom: Ingot Mold Car, compensating truck type Bauer patents.

TEN REASONS WHY MORE THAN 1000 TREADWELL INGOT MOLD CARS ARE NOW IN SERVICE

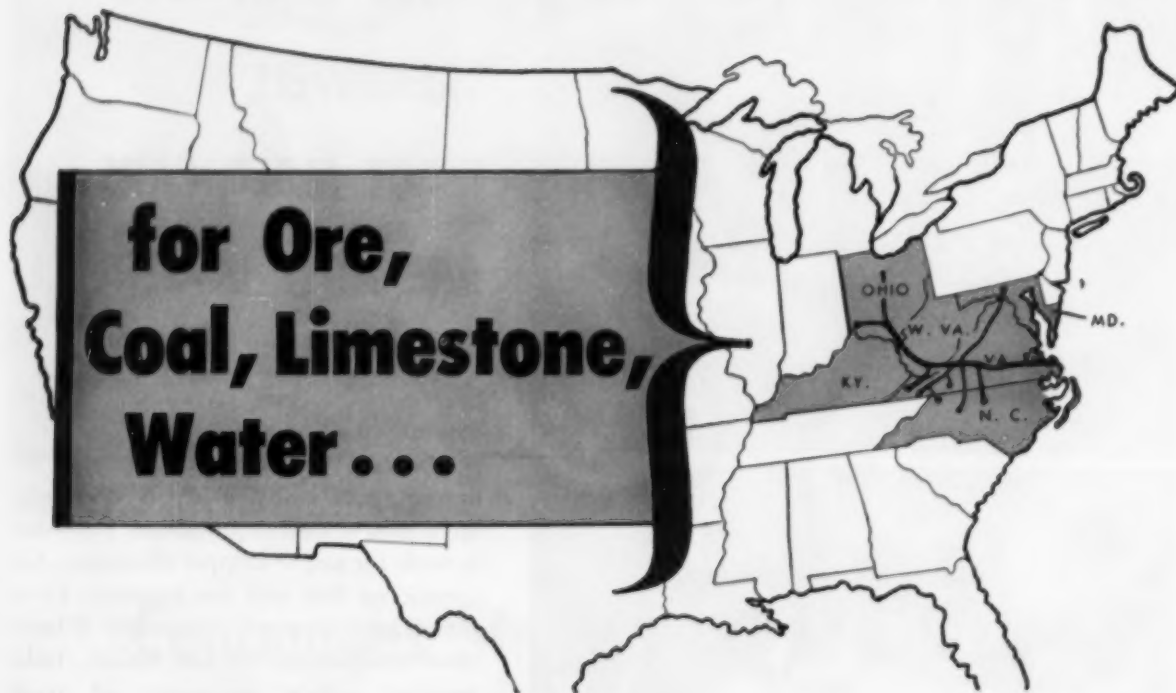
Consider these items feature by feature. The body is a single unit. Center of gravity is especially low. The trucks may be removed quite easily. Body is overhung. Stool rests to meet requirements. Provision is made for ample stripper allowance. Automatic or link and pin couplers. Floor protection plates are replaceable. Wheels move independent of side frames. Independent vertical movement of truck frames.

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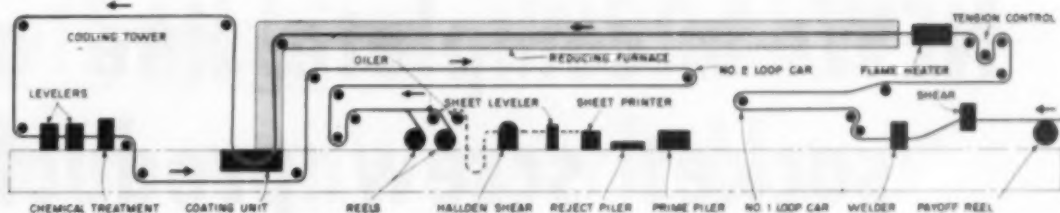
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Norfolk and Western Railway



The entire length of the \$6,250,000 continuous galvanizing line can be controlled from this panel. Operator keeps in touch with two-way inter-communication set

CONTINUOUS STRIP . . .

tering the bath is 900°F. Electric controls keep the bath at an even 850°F. "If temperature controls would fail and the heat drop below 850°F, we would get a bumpy or poor coating. Hence the temperature control is all-important to us," J&L engineers explain.

Coating Control—The coating can be thickened on the steel by immersing the coating rolls farther into the bath. For optimum results, J&L stresses proper control of all stages of production, but safeguards would be wasted if analysis in the bath were not maintained constantly. The bath is tested each day and the amount of zinc, zinc alloy and aluminum melted is precisely regulated.

"An advantage of the Armco-Senzimir process over other methods is annealing on the line," J&L says. "There's no need for additional area to anneal and cool."

J&L's line is housed in a building 100 to 175 ft wide where space is at a premium. With no extra area for annealing and cooling, there are fewer inventory problems and more flexibility for serving customers.

Potential—C. L. Austin, president of J&L, reports that the new line can produce 7000 to 8000 tons of galvanized sheet each month.

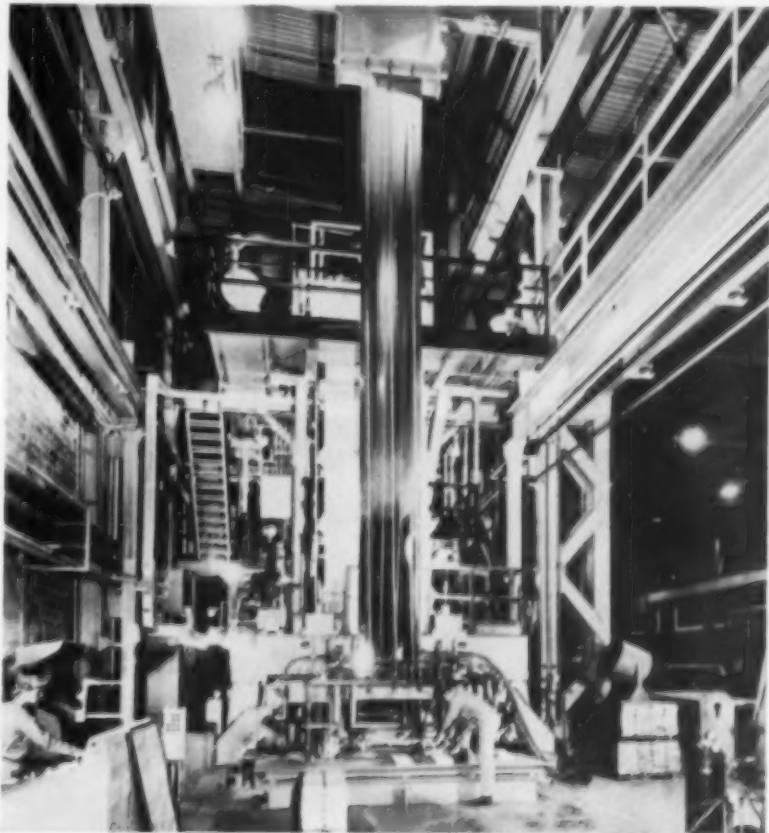
"We decided on the Armco-Senzimir process because our investigation showed that it produces galvanized sheet with excellent adherence, good forming properties, and an attractive appearance," says John E. Timberlake, vice president, sales.

For J&L, production of galvanized sheet brings diversification of the steel product line and many

new customers. Among the 200 customers now buying galvanized steel from J&L, 100 are new.

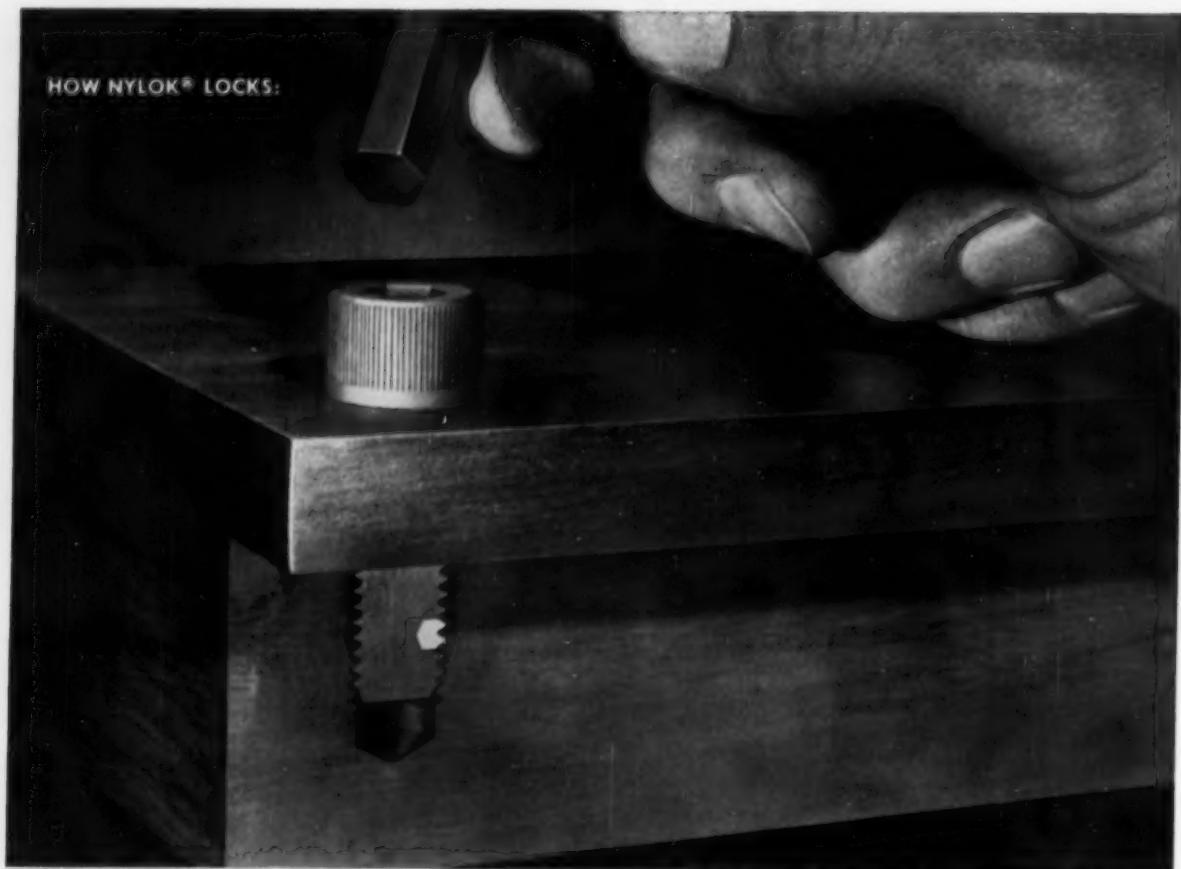
More than half of the nation's galvanized sheet is already made by continuous galvanizing lines (STEEL, May 30, 1955, p. 107). When all present projects are completed, continuous lines will account for more than three-fourths of the total capacity.

The mill project was handled completely by Aetna-Standard Engineering Co., Pittsburgh, including the building construction.

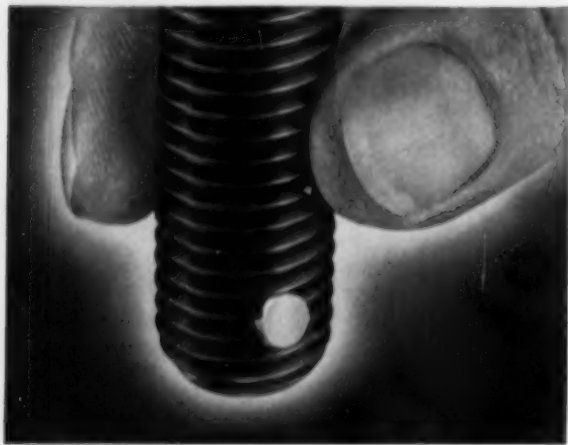


Zinc pig being added to the molten galvanizing bath. The sheet emerges from the bath through coating rolls which can be raised or lowered to control the coating thickness

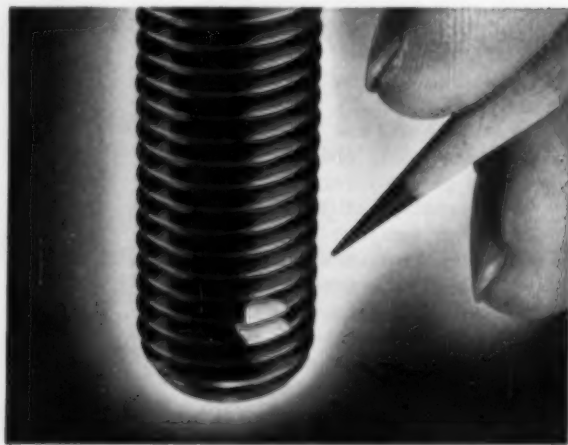
NEW—a complete line of socket screw products



LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together, and locks the screw securely.



BEFORE ASSEMBLY. The nylon pellet projects slightly beyond male threads. When assembled, female threads will be impressed into it. Pellet locks effectively whether the screw is seated or not.



AFTER REMOVAL. "Plastic memory" of pellet has expanded impressed threads to greater diameter than screw threads. Screw can be used repeatedly. In use, "memory" keeps threads tightly locked.

self-locking UNBRAKO that won't work loose

They simplify design and save production time

UNBRAKO socket screws are now available embodying the Nylok[®] self-locking principle. Nylok provides a truly practical new solution to the problem of making screws self-locking.

An UNBRAKO screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not shake loose.

You save production time when you build products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lock-washers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. So are cotter pins and complex multiple set screw installations.

Self-locking UNBRAKOS are completely reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from -70° to 250° F. And, on properly seated screws, the pellet acts as a liquid seal.

Self-locking UNBRAKO socket screws come in a complete range of standard sizes and materials. See your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

**T.M. Reg. U.S. Pat. Off., The Nylok Corporation*

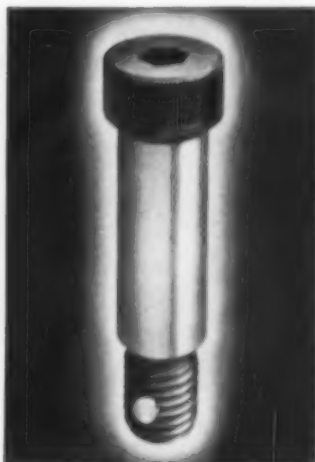
UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

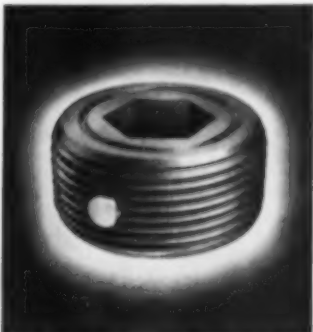
SPS
JENKINTOWN PENNSYLVANIA



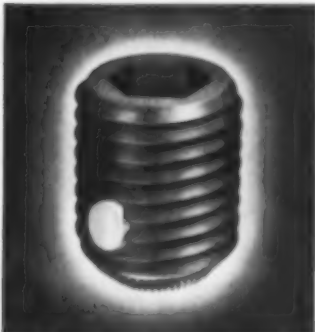
Socket head cap screws. Standard sizes # 6 to 1 in.



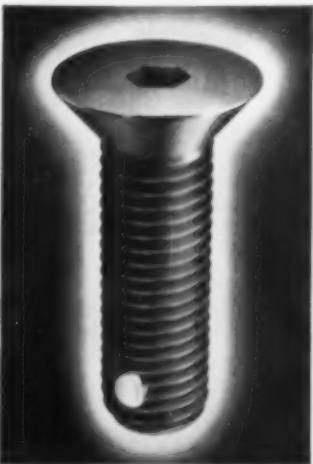
Socket shoulder screws. Standard sizes 1/4 to 3/4 in.



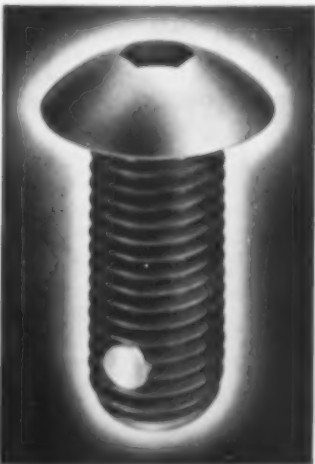
Socket pressure plugs. Standard sizes 1/4 to 1 1/4 in.



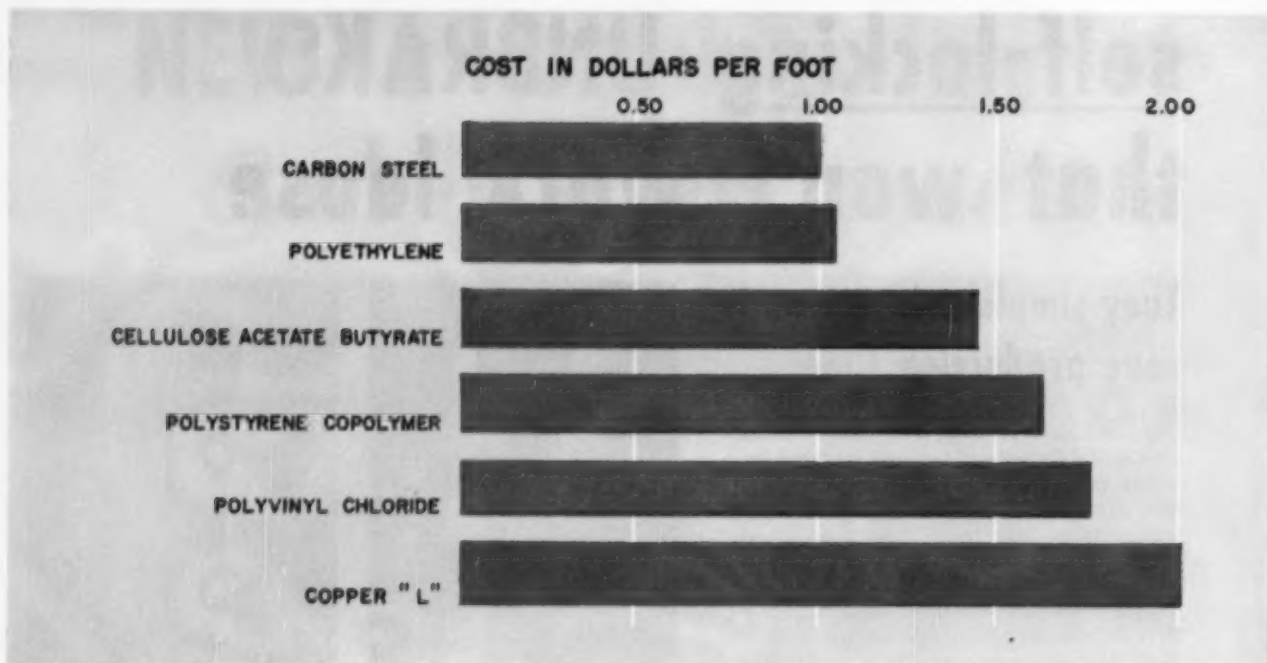
Socket set screws. All standard point types. Standard sizes # 6 to 1 in.



Flat head socket screws. Standard sizes # 6 to 3/4 in.



Button head socket screws. Standard sizes # 6 to 3/4 in.



It will never replace metal pipe entirely, say its makers.

But it can do a better job in many metalworking applications

Plastic Pipe Finds a Place

EVERYONE is familiar with plastic garden hose. Some still think it is a substitute for better material. Many accept it as a prime material, a quality product in its own right.

Industry feels much the same about plastic pipe. Perhaps you've heard it referred to as a replacement for metal. It isn't. Plastic stands up to metal in many applications; in some places, there is no substitute for plastic. It outperforms its metal cousins.

Here To Stay—The Plastics Division, Monsanto Chemical Co., Springfield, Mass., estimates that up to 15 per cent of the metal pipe markets could be taken over by plastics.

Republic Steel Corp., Cleveland, makes and sells plastic pipe. It is one of several steel firms to rec-

ognize that plastic has found its place in the industrial picture and is here to stay. Republic's mines use plastic pipe. Highly corrosive mine water eats through steel in a few weeks. The plastic lasts for years.

Advantages—Resistance to corrosion is only one of many outstanding advantages. Plastic pipe is widely used in the chemical and food processing industries. All pipe made from new, prime material was recently approved for drinking water systems by the National Sanitation Foundation.

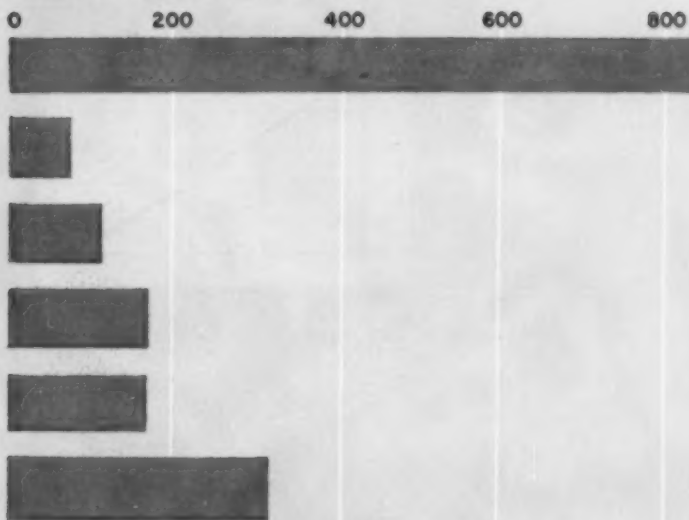
Plants with their own wells frequently have trouble with scale build-up, iron sludge and electrolytic corrosion. Plastic pipe resists all three. It has a superior, smooth surface with good flow characteristics.

Example—A plant near Magnolia, Ark., has a well that produces a highly acid water. With steel pipe, it produces a condition called "red water." It used to be normal to replace the steel pipe every year and a half; so far, the plastic has lasted three years. In a similar case, alkaline soil in southern Colorado wore out galvanized iron pipe in six months. It looks like the plastic pipe which replaced it is indestructible.

Flexible—Most plastic pipe is flexible enough to bend in large radiuses. It isn't necessary to use many fittings. This puts many installations in line with black iron pricewise. It also contributes to the excellent flow characteristics of plastic pipe systems by reducing turbulence.

Freezing merely expands poly-

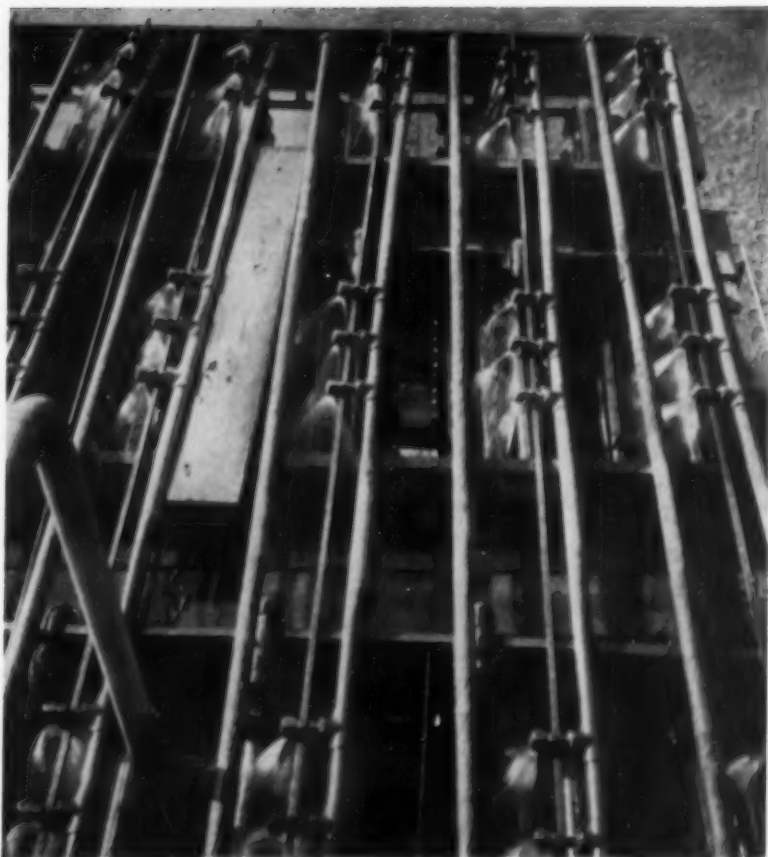
WORKING PRESSURE (70°F)



MAXIMUM TENSILE STRENGTH



Source: Monsanto Chemical Co.



Hydrogen sulfide and cyanide from a nearby coke quencher corrode iron pipe on this cooler in six months. Plastic pipe shown is 2 years old

ethylene. When the thaw comes, the pipe returns to normal. Metal pipe usually splits.

Oil field people like plastic for sour crude lines for two reasons: It resists paraffin build-up and salt water corrosion. Many industrial plants can take a tip here. Underground oil storage tanks for fuel oil use recirculating or electric preheaters to prevent sludge formation in connecting lines. Plastic pipe might eliminate this. In addition, if a clear type were selected, operating engineers could check fuel flow visually. A small coil (some types come in coils, like garden hose) makes a good emergency line.

Lined Pipe—Where high pressures are involved, steel pipes can be lined with plastic. Several firms provide plastic-lined steel fittings, valves and even pumps. Republic recently found a way to coat the outside of steel pipe, an improvement on the more common anticorrosion wrappings.

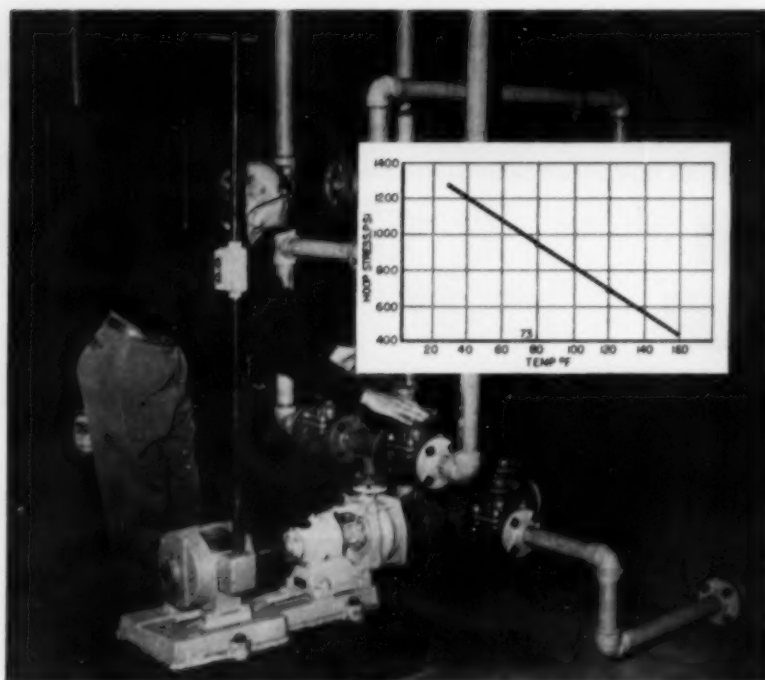
Types—There are four leading types of plastic pipes: Polyethylene, cellulose acetate butyrate, polystyrene copolymers and rigid polyvinyl chloride (PVC). Of these, polyethylene accounts for about 80 per cent of the market,

the cellulose acetate butyrate and polystyrene copolymers, about 6 per cent each. PVC is relatively new. According to many engineers, it has the greatest potential. Some even call it "the phenomenon of the industry." Others say that butyrate is the dark horse. One maker claims it has already sold more butyrate pipe in 1956 than all PVC sold in the last 18 months.

Which type is best? It depends on the use. Some are interchangeable in all but a few applications. In any case, consult the pipe suppliers. Most of them have impartial plastics engineers.

Specials—One highly specialized class of pipe is made from glass fibers and polyester resins. It stands higher pressures and temperatures than other types now in use.

The high cost of glass fiber reinforced pipe (\$12 a foot, installed) limits it to jobs where lead, glass and stainless steel can't be used. One large steel firm is completing arrangements for a plastic pipe installation to handle



Tube Turns Plastics Inc.

This plastic pipe handles chromic acid in a plating plant, operates at 25 to 75 psi and 50 to 90°F. Graph (inset) is for Eastman's Tenite (butyrate); pipe gets weaker as temperature increases

The Uses of Plastic Pipe

Material	Sizes (in.)	Lengths (ft)	Uses
Polyethylene (general purpose)	0.25 to 6	Coils to 500	Sewerage Mines Cold water systems Jet wells Irrigation Corrosives Sprinkler Systems
Cellulose Acetate Butyrate	0.5 to 6	Coils to 500; straight lengths, 20 & 30	Gas lines Cold water systems Oil fields Corrosives Electrical conduit Sprinkler systems
Polystyrene Copolymers	0.5 to 6	Straight Lengths 10 & 21	Gas lines Cold water systems Jet wells Irrigation Oil fields Food industry Corrosives Sprinkler systems
Rigid Polyvinyl Chloride (PVC)	0.5 to 15	Straight Lengths 4, 10 & 20	Corrosives Chlorine fumes Acids Alkalis Salt Oxidizing agents

Source: Plastics Division, Monsanto Chemical Co., Springfield, Mass.

sulphuric acid slurries. In another case, the steam injection lines for heating pickling solutions are glass fiber reinforced plastic pipe.

A. N. T. St. John of the Resistoflex Corp., Roseland, N. J., predicts that the price of this specialized pipe will be reduced and applications will increase. Another firm expects to be in production by the end of the year.

Installation—A few types can be joined by threaded fittings. Other methods used: Slip sleeve and bond; slip sleeve and clamp; flange; extruded sleeve and solvent weld; and heat weld.

The Tennessee Eastman Co., division of Eastman Kodak Co., Kingsport, Tenn., recommends injection molded fittings for its butyrate pipe. Solvent and cement are applied to the end of the pipe and to the inside of the fitting. The joint is made by inserting the pipe into the coupling and twisting a half turn.

Joints to metal pipe are easily made with plastic to metal adapters, flanges or compression type couplings. Butyrate pipe is easily formed by heating the pipe end in



Anaconda 15 kv aerial cable installed at oil refinery.

New high-voltage cable cracks the ozone barrier



SAMPLES of Type AB insulated cable bent in small circles are placed in ozone chamber for ozone-resistance test.

Butyl insulation in Anaconda Cable exceeds ozone-resistance test requirements by 2400%

Under high electric stress, minute particles of air break down, form corona. This generates ozone which may combine with the rubber hydrocarbon of the insulation. Without superior ozone resistance, the insulation fails.

But now you can get extra protection against ozone—and ozone damage—with Anaconda Type AB butyl-insulated cable. This insulation is compounded for *inherent* ozone resistance along with other desirable properties.

In standard ozone-chamber test, Type AB insulation (after aging) shows no injury after 72 hours in 0.025-0.030% ozone concentration . . . 24 times longer than required by oil base and butyl specifications.

New Engineering Bulletin EB-27 gives full details on performance of Type AB insulation in 15 Industry Specification Tests. See the Man from Anaconda or write: Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y. 10001

SEE THE MAN FROM **ANACONDA**[®]
pioneer in BUTYL INSULATION



Tennessee Eastman Co.

Plastic pipe makes good electrical conduit, particularly around corrosive atmospheres or soils. Flexibility makes turns like this easy. Absence of fittings makes it easy to fish around corners.

hot oil, then forming it on a metal die.

Disadvantages—Plastic pipe has limitations, of course. Temperature and pressure are the chief ones. Only three types—polyethylene, butyrate and Kralastic—are competitive pricewise with black iron. PVC is more expensive (just under copper).

Local building codes may interfere. The Society of the Plastics Industry Inc., 67 W. 44th St., New York 36, N. Y., has useful data. It and the National Sanitation Foundation collaborated on drinking water research.

Contractors or plumbers, unfamiliar with the new material, tend to overcharge. Monsanto Chemical Co. notes an example where a contractor charged a customer nearly 70 per cent more than necessary. Local training programs and consultation with established, experienced contractors will solve this problem.

Use — The accompanying data (page 126) will give you an idea of how others are using plastic pipe. It may suggest applications in your plant.



This seal will identify pipe that is unconditionally approved by the National Sanitation Foundation,

Ann Arbor, Mich., for drinking water and other liquids such as soft drinks

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Foreign Builders Show Automation

Foreign machine tool builders focus on automatic controls at London show. It spells more competition abroad for American special purpose machines

JUDGING BY the International Machine Tool Exhibition in London, American builders are in for even stiffer competition from their foreign counterparts.

Automation, or at least automatic control, was the highlight, just as it was at the 1955 Chicago show.

STEEL's London editor, Vincent Delport, picks these as the most significant trends he saw in foreign machines:

- Marked development in automatic handling for single and multistation machines.
- More widespread use of electronic controls.
- Air-operated control equipment for transfer machines.
- Widespread attention given to tracer and copying systems.
- Developments in mechanical and electrical equipment for measurement and control and increased accuracy of the machines.
- More rugged construction of the basic machine, accompanied by higher horsepower to meet the needs of faster cutting.

Devoting attention to the automated, special purpose machine, foreign builders are stepping up the competition they've given U.S. standard machine tools for some time. They'll also be tough competitors for American builders of mass production equipment.

Interpretation

Most U.S. machine tool builders agree the foreign market is well worth going after. In some cases, though, it has been increasingly tough to crack. Part of the answer lies in the rapid strides being made by foreign builders.

Evidence—If there were any

doubts about this before, they were practically erased at the big British show. Coming on the heels of several machine tool shows, including the huge U.S. exposition in Chicago, this one could have flopped. It didn't.

Covering more than 252,000 sq ft, some 1500 machines were displayed. Exhibitors, in addition to those from Great Britain, came from the U.S., all the industrial nations of Western Europe, Czechoslovakia and Hungary.

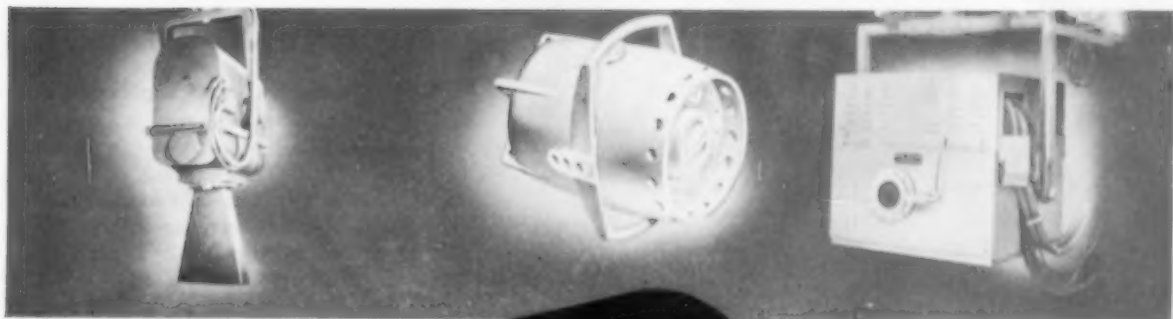
Crowded—For some time it has been thought that there are too many machine tool builders abroad. "When the market settles down," observers have claimed, "many of the small European builders will fall by the wayside."

This may be true. But this group has come up with improved machines that represent (particularly with their severe cost advantages) serious competition for American builders abroad.

Join 'Em—Two answers in evidence at the London show: American firms are building machines in their foreign plants, or they are licensing foreign builders to build and market the machines abroad. Such schemes help to overcome disadvantages like labor cost, currency restrictions and tariffs.

Domestic Orders Dip

Machine tool orders reported by American builders continue to click along at a rate that can give them a \$1-billion year. The mark is possible despite a drop to \$62.4 million for June, off nearly \$25 million from May business. The National Machine Tool Builders' Association figures the midyear total at \$509.15 million.



Kodak Industrial X-ray Film, Type AA



Read what the new Kodak Industrial X-ray Film, Type AA, will do for you.

- Reduces exposure time—speeds up routine examinations.
- Provides increased radiographic sensitivity through higher densities with established exposure and processing technics.
- Gives greater subject contrast, more detail and easier readability when established exposure times are used with reduced kilovoltage.
- Shortens processing cycle with existing exposure technics.
- Reduces the possibility of pressure desensitization under shop conditions of use.

Here is a brand-new x-ray film that gives you greatly increased film speeds. It is a film that retains the fine sensitivity characteristics which have made Kodak Type A the most widely used x-ray film in industry. Then in addition it gives speeds up to more than double those of Type A.

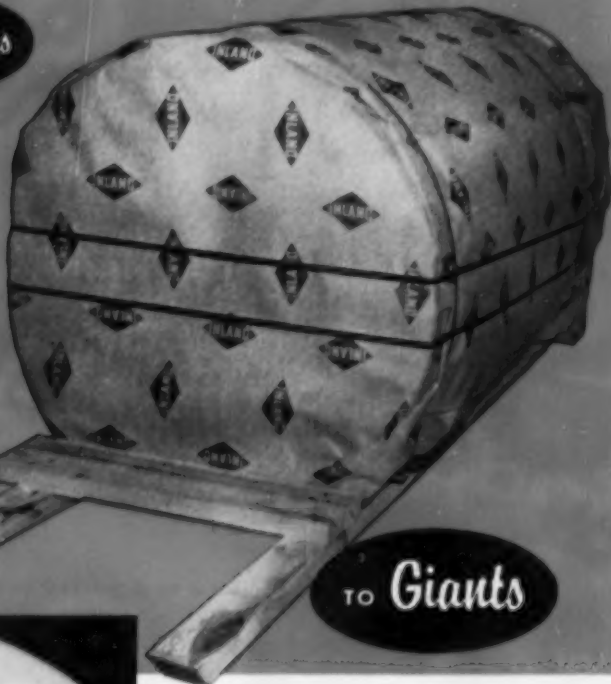
This means that you can cut down exposure time, handle routine examinations more quickly.

Your x-ray dealer and the Kodak Technical Representative are ready to tell you all about this new film. Get in touch with them. See what it will mean to you.

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THILCO IS SOLVING MORE METAL PROTECTIVE WRAPPING PROBLEMS ... THAN EVER BEFORE!

Wrapping steel and non-ferrous metals of any size is no problem to Thilco. We can furnish protective papers as narrow as you want for spiral wrappings of small products and parts—or as wide as 10 ft. for skid wraps and covers and in giant "blanket" sizes for shrouds and tarpaulins.

FUNCTIONAL PURPOSE NO PROBLEM — Thilco papers are made in any number of grades for waterproof protection, prevention of moisture-vapor transmission and grease and oil penetration. Thilco also produces an endless variety of special treatments and paper combinations to meet any functional purpose. And, Thilco can make any grade just about as tough and durable as your demands call for.

GET TO KNOW THILCO — Chances are 100 to 1 we can help solve your protective wrapping problem. We'll be glad to have a representative tell you more, at your request — Or, write and tell us your problem. No obligation, of course.

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- **WRAP-DRI** Waterproof protective papers
- **THILCO-TUF** Stainproof laminated papers
- **VAPOTITE** moisture-vapor barrier papers
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- **MO and MF** natural and colored krafts
- **GLASSINE** and greaseproof papers
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Gage School

Course on how to calibrate with simple equipment is free to qualified industries

A FREE, four-day course on how to inspect your gage blocks is offered by the DoAll Technical Institute, Des Plaines, Ill.

Students study: Orientation, principles and techniques of interferometry, dimensional controls for tolerances, observational error and related subjects.

Simplicity—The program, which is called "How To Be Your Own Bureau of Standards," emphasizes that equipment needed for checking gage blocks is small and inexpensive. It teaches that techniques for the measurement of millionths of an inch are simple but exacting.

In the laboratory, students learn procedures, operation of instruments and methods of calibration. Each trainee brings a set of his company's gage blocks. At the conclusion of the course, the blocks will have been inspected and dimensions of each shown on a report prepared by him.

Inexpensive—The do-it-yourself equipment for flatness and wear checking consists of: 1. A monochromatic light source. 2. Optical flats. 3. A deburring stone. 4. Miscellaneous cleaning and wiping equipment.

Instructions for the equipment are complete. Charts are provided for comparison of fringe line readings to speed up the flatness readings.

Additional equipment is needed to check the several higher grades of gage blocks: An electronic comparator and a set of master blocks. The masters should be within plus or minus 2 millionths of an inch.

The institute's sponsors, the DoAll Co., Des Plaines, Ill., say that air-conditioned rooms are not necessary to the successful inspection of gage blocks with its system. Continuous checks will result in greater accuracy of inspection and production.

The institute says its program has been approved by the National Bureau of Standards.

Electric Tractor Has a Drawbar Pull of 3000 Lb

On model 751 the seat is placed at the rear so the driver can couple and uncouple trailers without leaving the seat.

The series-wound, traction-type motor with high overload capacity is connected to the drive by a double universal joint.

The tractor drive consists of double-reduction spiral-bevel and spur-gear differential and a full-floating drive shaft. Top no-load speed is 7½-mph. Write: Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9, Ill. Phone: Yards 7-2515



Universal Grinder Makes Setups Quickly



Infinitely adjustable work speeds from 60 to 360 rpm are provided by the 14 and 18-in. U-4 machines.

The wheel head has a double swivel, one above and one below the slide ways, which permits independent angular settings of grinding wheel position and grinding wheel feed. The wheel can be set at any angle and fed at any angle.

The change from conventional to chucking grinding only requires swiveling the headstock 180 degrees and chucking the workpiece.

Both an external and internal grind can be done on a workpiece without disturbing the setup. The individually powered internal spindle is quickly swung down into grinding position. Write: Norton Co., Worcester 6, Mass. Phone: Pleasant 2-4641

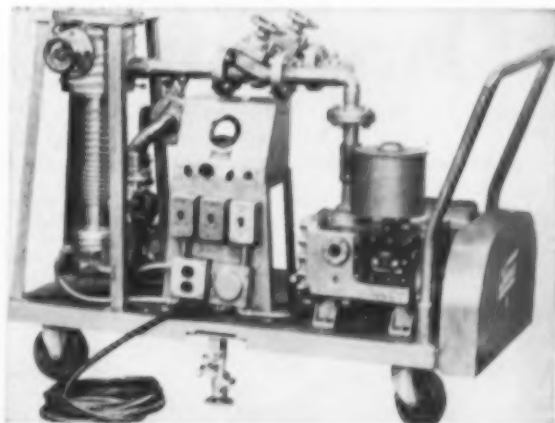
Portable High Vacuum System Exhausts 10 to 15-Cu-Ft Chambers

Absolute pressures as low as 10^{-6} mm of mercury are produced by this pumping system for general laboratory work, pilot plant operations and small scale production applications. The unit exhausts chambers for vacuum distillation, impregnation, coating, degassing, stress relieving, etc.

The system uses a fractionating 4-in. diffusion pump which is connected to a 15 cfm two-stage roughing and backing mechanical vacuum pump.

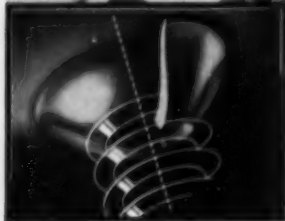
All components including an electrical control panel are mounted on a base fitted with two fixed and two swivel wheels, caster lock and pull handle.

Service connections required are an alternating current outlet and cooling water. Write: Kinney Mfg. Division, New York Air Brake Co., Boston, Mass. Phone: Jamaica 4-3220



SPECIALS?

FASTENERS • CLIPS • CLAMPS • FORMS



Creators of the famous Prestole "impression that lasts"—the strongest geometrical shape, with full 360° grip on the screw.

PRESTOLE can solve the fastening problem that is making any assembly operation slow, complicated, and costly, with a Prestole special-type fastener.

When it comes to development, design, and production "know-how" in the fastener industry, Prestole renders an intelligent, specialized engineering service.

Prestole designs and produces special-type fasteners in an endless variety of formed metal parts. Thousands of assembly problems have been solved by this aggressive, experienced organization of fastening engineers.

So, if your assembly problem calls for thread-engaging fasteners or special forms made of various metals—why not let Prestole solve it?

PRESTOLE Corporation

1310 MIAMI STREET • TOLEDO 5, OHIO

PRESTOLE OF CANADA, OAKSVILLE, ONTARIO

TELL US MORE ABOUT PRESTOLE DESIGN-ENGINEERING SERVICE FOR SPECIAL/STANDARD FASTENERS.

TO:

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Company _____

Street _____

City _____

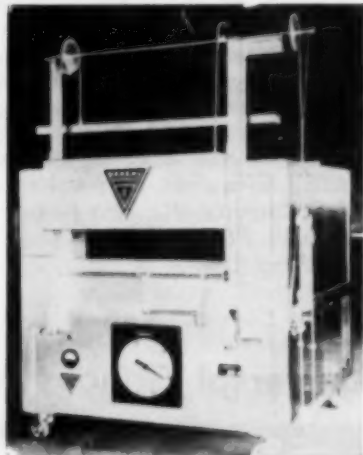
Zone _____ State _____

We Manufacture:

NEW PRODUCTS and equipment

Heat Treating Furnace

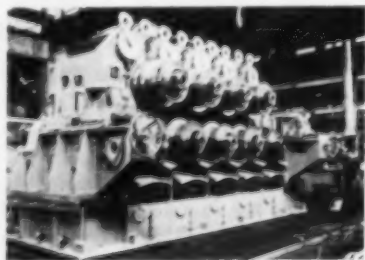
Model TF-12 is a portable heat treating furnace that has its power and temperature controls mounted in the base. Chamber size is 12 x 36 x 48 in.



The U-shaped hearth contains silicon carbide heating elements placed front-to-back on side walls to give an operating temperature of 2200°F. Maximum heatup takes 3 to 4 hr. Power rating is 20 kw. Write: Pereny Equipment Co., 893 Chambers Rd., Columbus 12, O. Phone: Axminster 9-8444

Roller Straightener


Structural sections, sheet piling, wide flange beams and heavy rails are straightened by this unit. It operates at speeds up to 500 fpm.



The straightening process improves the grain structure of the material through cold working. Lengths up to 100 ft can be straightened.

The main drive uses high precision gearing divided into two groups, each driven by a separate integrally mounted motor. This

STEEL



Will your steel order
receive *individual* attention?

Although many companies are having trouble securing the steel they need from warehouse sources, of one thing you can be sure . . . Levinson people will never stop knocking themselves out to help their customers solve their material problems.

Sometimes we can pick up part of what you need some other place or perhaps figure out a suitable substitution . . . or maybe our engineers can plan a splicing or welding job that will fill your needs. We may not have the answer to your problem in our hip pocket, but you'd be surprised how often we can help work it out.

just . . . Leave it to **LEVINSON**

Warehouses, fabricators, designers
of steel for over half a century

the
LEVINSON STEEL

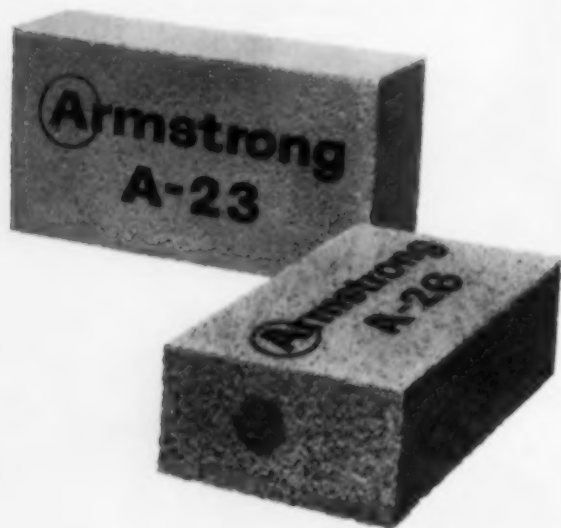


COMPANY

20th & Wharton Sts.
Pittsburgh 3, Pa.
Phone: HUBbard 1-3200

Identified . . .

two markings
cut handling time
of all Armstrong
Insulating Fire Brick

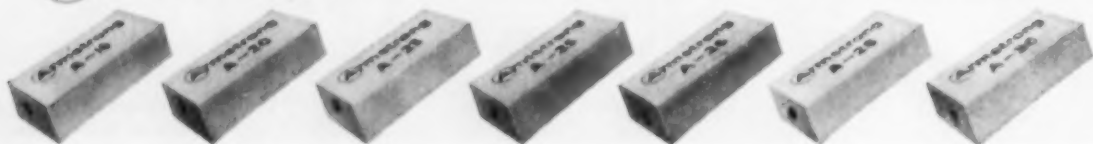


On jobs where several brick types are used, avoid mistakes and speed bricklaying with Armstrong Insulating Fire Brick. They're double-identified to make it easy to get the right brick into the right place quickly. One face bears the brick type stenciled clearly, and one end is marked with a colored dot. This color varies with the brick type.

For a free booklet giving full information on Armstrong Insulating Refractories, write Armstrong Cork Company, 2708 Reed Ave., Lancaster, Pa. And whenever you have a furnace problem, you'll find your Armstrong engineer's knowledge of refractories helpful.



Armstrong INSULATING REFRACTORIES

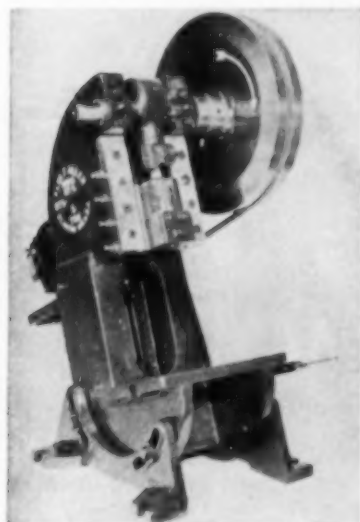


NEW PRODUCTS and equipment

arrangement prevents the overloading of the driving gears caused by friction locking of rolls of slightly varying diameters. Write: Loewy-Hydropress Division, Baldwin-Lima-Hamilton Corp., 350 Fifth Ave., New York 1, N. Y. Phone: Lackawanna 4-3855

Punch Press

Model B-5 is a 5-ton bench punch press that will do up to 280 operations a minute—continuous punching, shearing, forming, riveting, blanking, cutting, drawing, etc.



A 65-lb flywheel assures ample power for heavy duty operations. The ram is easily adjusted for die setting. Standard stroke is 1 1/4-in. Write: Punch Press Department, Alva Allen Industries, Clinton, Mo. Phone: 1286

Spring Tension Gage

Tensions are registered in grams on this gage for testing springs used in delicate electronic applications.



Four models have calibrations extending from 10 to 150 grams on either side of zero in 1 to 5 gram steps. The gages can be used to indicate left to right or right to

left. Write: P. K. Neuses Inc., W. Euclid & Dwyer St., Arlington Heights, Ill. Phone: Clearbrook 3-6555

Soft Rubber

Compound RRD-992 is a nonporous rubber that can be bonded to metal. It has a softness characteristic of 5 durometer and can be used at temperatures up to 200°F. It is a reasonably good electrical insulator.

The rubber is made in sheet or strip up to 1 in. thick, or the company will mold or bond it to meet customer needs. Write: Roth Rubber Co., 1860 S. 54th Ave., Chicago 50, Ill. Phone: Blahop 2-1060

Iron Powder Electrode

Easyarc 14 is for all types of mild steel fabrication, especially vertical down welding of sheet metal and ornamental iron. It has no tendency to "flat-top," and its

HANSEN

**QUICK-CONNECTIVE
2-WAY
SHUT-OFF
COUPLINGS!**



QUICK CONNECTION
AND
DISCONNECTION

INSTANT
AUTOMATIC FLOW
OR SHUT-OFF



**Seals Both Ends of Line
AUTOMATICALLY
INSTANTANEOUSLY**

*Quick Connective
Fluid Line Couplings for*

**AIR • OIL • GREASE • STEAM
HYDRAULIC FLUIDS • VACUUM
REFRIGERANTS • OXYGEN
ACETYLENE • GASOLINE
WATER • COOLANTS**

**NOSE CLAMPS
NOSE CLAMP PLUGS
NOSE CLAMP SOCKETS
NOSE CLAMP COUPLINGS**

To connect a Hansen Two-Way Shut-Off Coupling, you just pull back the sleeve and push the Plug into the Socket. To disconnect, merely pull back sleeve. No tools required. Similar valves in Socket and Plug shut off both ends of line when Coupling is disconnected—practically eliminate spilling of liquid or escape of gas at instant of disconnection.

**FEMALE PIPE THREAD CONNECTIONS
FROM 1/8" TO 1"**

Hansen Series HK Two-Way Shut-Off Couplings are available with female pipe thread connections from 1/8" to 1" inclusive. Available in brass or steel.

*Also Straight-Through and One-Way
Shut-Off Couplings. Write for Catalog.*

REPRESENTATIVES IN PRINCIPAL CITIES

SINCE 1915

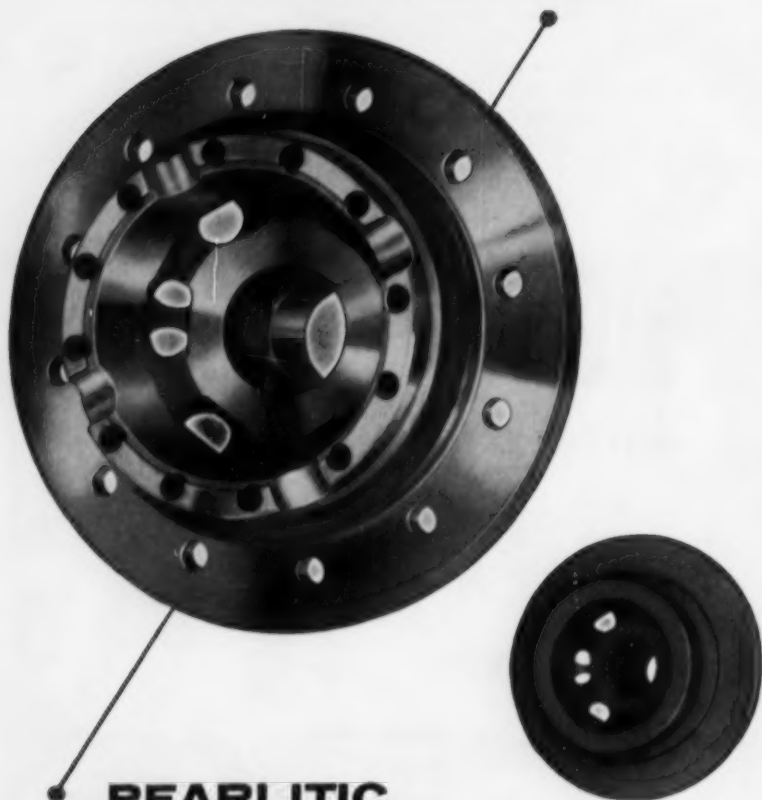


QUICK-CONNECTIVE FLUID LINE COUPLINGS

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

MACHINABILITY INDEX 80-90*



PEARLITIC MALLEABLE CASTINGS

*B1112 STEEL = 100

Low machinability index of 80-90 (B1112 steel = 100) is probably reason enough to warrant serious consideration for your product.

But pearlitic malleable castings—from National—don't stop there. They have great ultimate strength . . . resist wear under heavy loads at high speeds . . . make excellent non-seizing bearings . . . can be air or liquid-quenched . . . can be smooth-finished.

Don't overlook the advantages of pearlitic malleable. For pearlitic malleable castings—from National—can often reduce manufacturing costs, weight and assembly time . . . can increase the sales potential of your product.

AA-1000

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

NEW PRODUCTS and equipment

smooth beads and easy slag removal make it particularly applicable for horizontal fillets. Write: Air Reduction Sales Co., division of Air Reduction Co. Inc., 60 E. 42nd St., New York 17, N. Y. Phone: Murray Hill 2-6700

Shaft Knurling

This machine makes about 3000 spline-type knurls an hour on small electric motor shafts. It produces a knurl up to 3 in. long on shafts up to 20 in. long and up to 3/4-in. in diameter.



Shafts are hand fed down a magazine and automatically roll out into a receiving tray after being knurled. Write: Morley Machinery Corp., 1239 University Ave., Rochester 7, N. Y. Phone: Greenfield 3660

Pickling Bath Additive

Akweons 674 is a wetting agent and emulsifier used as a rust preventive and corrosion inhibitor for steel. It also helps depress fumes in the pickling process.

The material can be added to any sulphuric, hydrochloric or phosphoric acid bath. Write: Industrial Oil Department, Swift & Co., 1800 165th St., Hammond, Ind. Phone: Tilden 4-6860

Brazing Flux

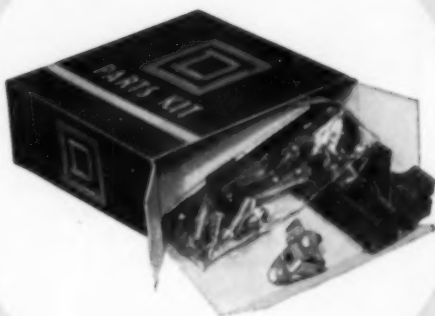
Stainless and other high alloy steels can be brazed at high temperatures with Nicrobraz flux. The

Here's Why We Specify **SQUARE D Starters** on the Machinery We Buy



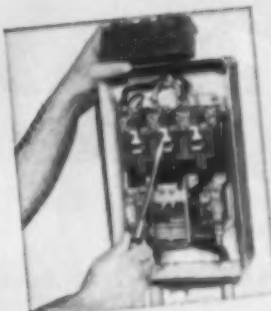
PERFORMANCE, EASY INSPECTION AND MAINTENANCE

Sure, we like Square D performance because it keeps our "down time" at a minimum. BUT—everybody knows that even the best starter needs periodic inspection and preventive maintenance. We like the way Square D makes it easy to handle those routine jobs.

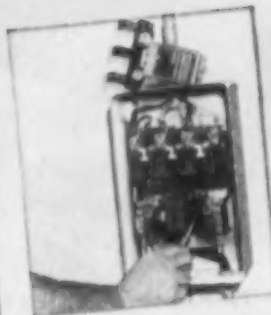


OFF-THE-SHELF PARTS KITS

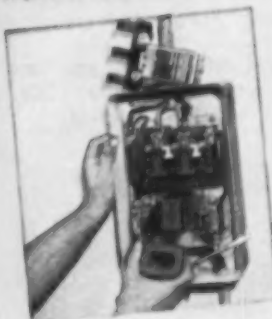
They make normal maintenance and modifications easier than ever. Packaged parts include interlocks, contacts, coils, overload relays, pushbuttons and selector switches. They're easy to buy, easy to identify, and faster to install.



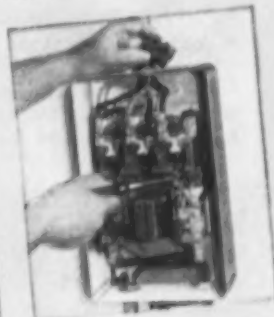
1 Loosen two screws and the arc chamber cover comes off. Every contact surface can be inspected at a glance.



2 Remove four screws and entire movable assembly can be lifted off. Disconnect two wires and slip off magnet coil.

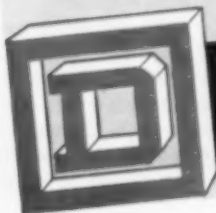


3 Contacts are attached with separate screws—they can be removed and replaced without disturbing any wiring. A screwdriver is the only tool needed.



4 Sizes 0 through 4 starters have these separate mounting electrical interlocks for easier installation. Contact block is attached from front of panel with two screws.

NOW... EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE!



SQUARE D COMPANY



INVESTMENT CASTING IS ECONOMICAL IF...

- Performance requirements demand use of alloys that are difficult to form or machine.
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- Part sizes are smaller than 10" or lighter than 10 pounds.
- Realistic tolerances and inspection standards are specified.

ARWOOD engineers will gladly help you with your design and production problems. They are casting specialists. Let them study your blueprints or a sample part and save you time, effort and money.

A CASE IN POINT! LIGHTER, STRONGER, CHEAPER

Stainless steel hinge for military ordnance component was formerly composed of a stamped bracket and machined hinge, welded together and assembled to a complicated anti-rotation device. Entire unit is now cast in one piece and is lighter and stronger. Hole-reaming is only machining required.



Write TODAY for your FREE copy of "A Critical Survey of Investment Castings", written especially for design and production engineers.

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NEW PRODUCTS and equipment

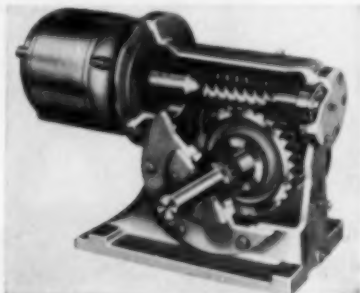
paste cleans and promotes wetting of the surfaces to be joined and helps dissolve oxide during brazing.

It is a smooth, creamy paste that does not separate or crystallize. Its melting point is below 1200°F, and it is recommended for brazing temperatures between 1600 and 2200°F. Within this range, it will not boil or run off.

Post-braze cleaning can be done with water. Write: Stainless Processing Division, Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich. Phone: Twinbrook 3-3800

Gearmotors

This is a line of right angle, single worm reduction units, with ratings from ½ to 30 hp, for alternating or direct current.



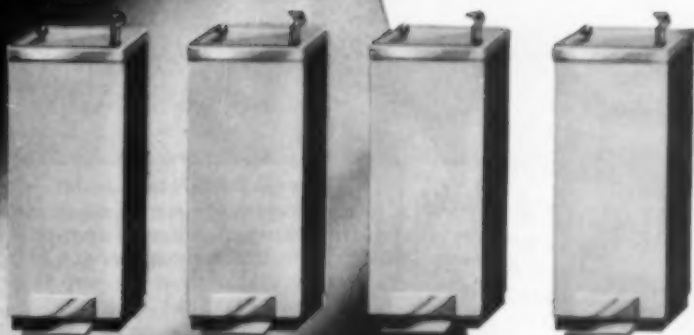
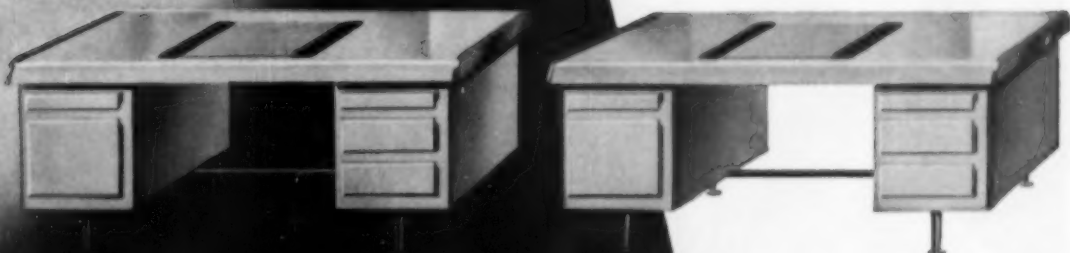
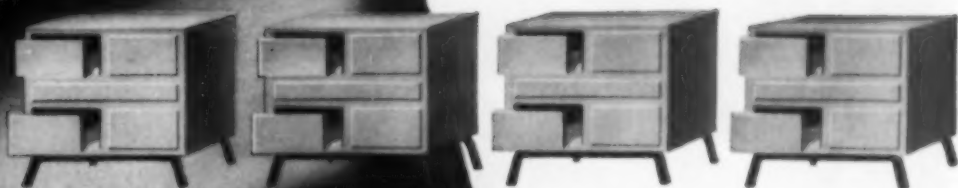
Worms, integral with the shafts, are made of hardened alloy steel. Threads are precision ground. Positive oil seals between motor and gear and on the output shaft prevent the escape of oil or contamination of lubricant. Write: Elliott Co., Jeannette, Pa. Phone: Lafayette 3-5422

Cleaning Castings

Sand, scale, graphite and other impurities are removed from the surfaces of gray iron castings by Virgo electrolytic salt.

The salt is compatible with other salts and can be added to electrolytic baths with no reduction in cleaning efficiency.

It is for use in cleaning processes involving a molten bath (operated at about 900°F), followed by a cold water quench and a hot rinse. While in the bath, the work is subjected to an electrolytic current supplied by a direct current gener-



For your
finest
products



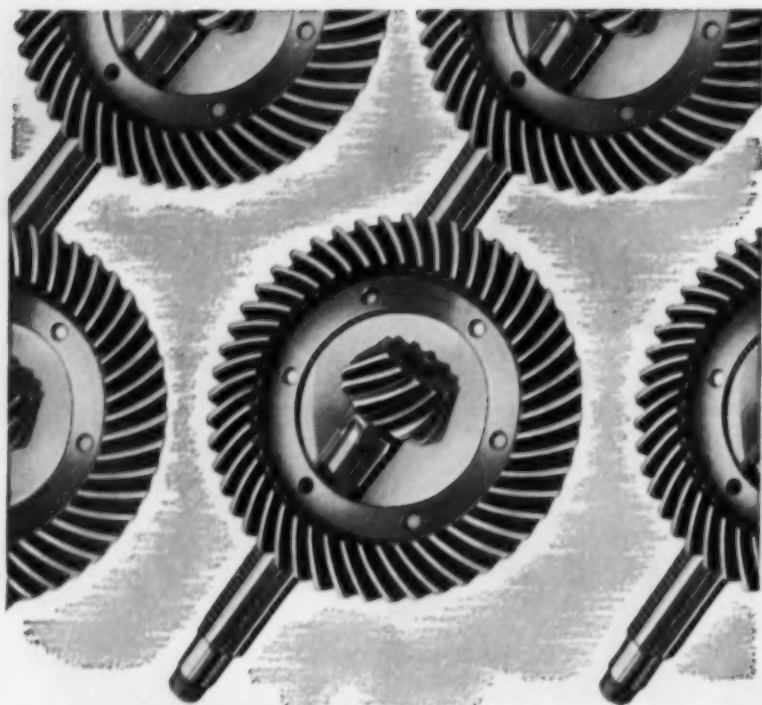
Sheets

Your particular requirements for uniformity in workability, formability and drawing properties guide every step in the production of J&L Sheet Steel.

Depend on J&L Sheet Steel to help you get the best out of your production equipment and add to the value of your finished product.

*Serving Steel Users Everywhere
—Linked by Water to the
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SAVES YOU MORE ON TOP-QUALITY GEARS

*Fine Gears
Made to Order*
for all manner of
industrial equipment

SPIRAL BEVEL
 STRAIGHT BEVEL
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• Send for your copy of illustrated bulletin describing Fairfield's facilities for making gears.

Fairfield is famous for repeat orders—and simply because quality is consistently high, and price is—well, just try to beat it!

How can Fairfield manage this unique position year after year? Truth is, it involves some tried-and-true mass-production methods plus some very special Fairfield ideas developed in the past 35 years of precision gear making.

Then, of course, Fairfield is ideally located with all facilities *under one roof*. Here you will find a complete metallurgical department, batteries of the most modern machines, testing laboratories, latest heat-treating equipment—all operated by skilled craftsmen working under expert engineering supervision.

There's another Fairfield service worth looking into—the expert recommendations on your particular gear problems. Your inquiry will receive prompt attention.

**FAIRFIELD
MANUFACTURING CO.**



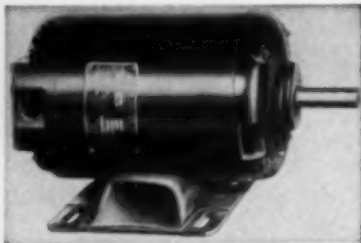
2313 SOUTH CONCORD ROAD • LAFAYETTE, INDIANA

NEW PRODUCTS and equipment

ator. No acid is needed. Write: Hooker Electrochemical Co., Box 344, Niagara Falls, N. Y. Phone: 6655

Motor Frame

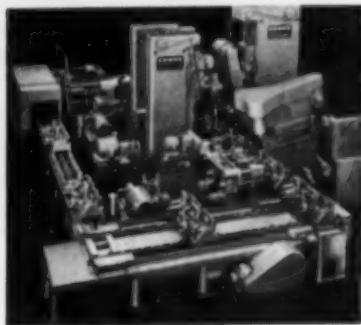
The 566 frame series combines 56 frame components with a base that gives the shaft height and mounting hole locations of a standard 66 frame. The shaft end has an oversized bearing.



Models are furnished with type C machine-face mounting. Write: Doerr Electric Corp., Cedarburg, Wis. Phone: Cedarburg-801

Transfer Machine

The Transfer-matic completely machines V-8 exhaust manifolds. It uses six stations to perform 51 operations—8 milling; 37 drilling, chamfering and spot facing; 6 tapping.



Preset tooling eliminates machine adjustments and trial cuts, reduces tool breakage, grinding costs and scrap. Write: Cross Co., Detroit, Mich. Phone: Walnut 1-3000

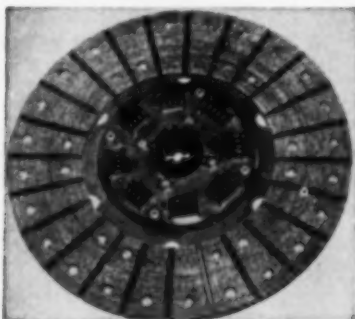
Spring Dampeners

The 14-in. spring dampener for direct pressure clutches absorbs torsional vibrations and cushions

STEEL

NEW PRODUCTS and equipment

the amount of torque shock transmitted to the drive line whenever the clutch is engaged.



The dampener is for use with clutches for heavy duty trucks, busses and off-the-highway vehicles. Write: Lipe-Rollway Corp., 806 Emerson Ave., Syracuse, N. Y. Phone: 75-3131

Coil Positioning

Strapping in a horizontal position on the slitting line is made easy with the transfer mandrel and coil tilt table.

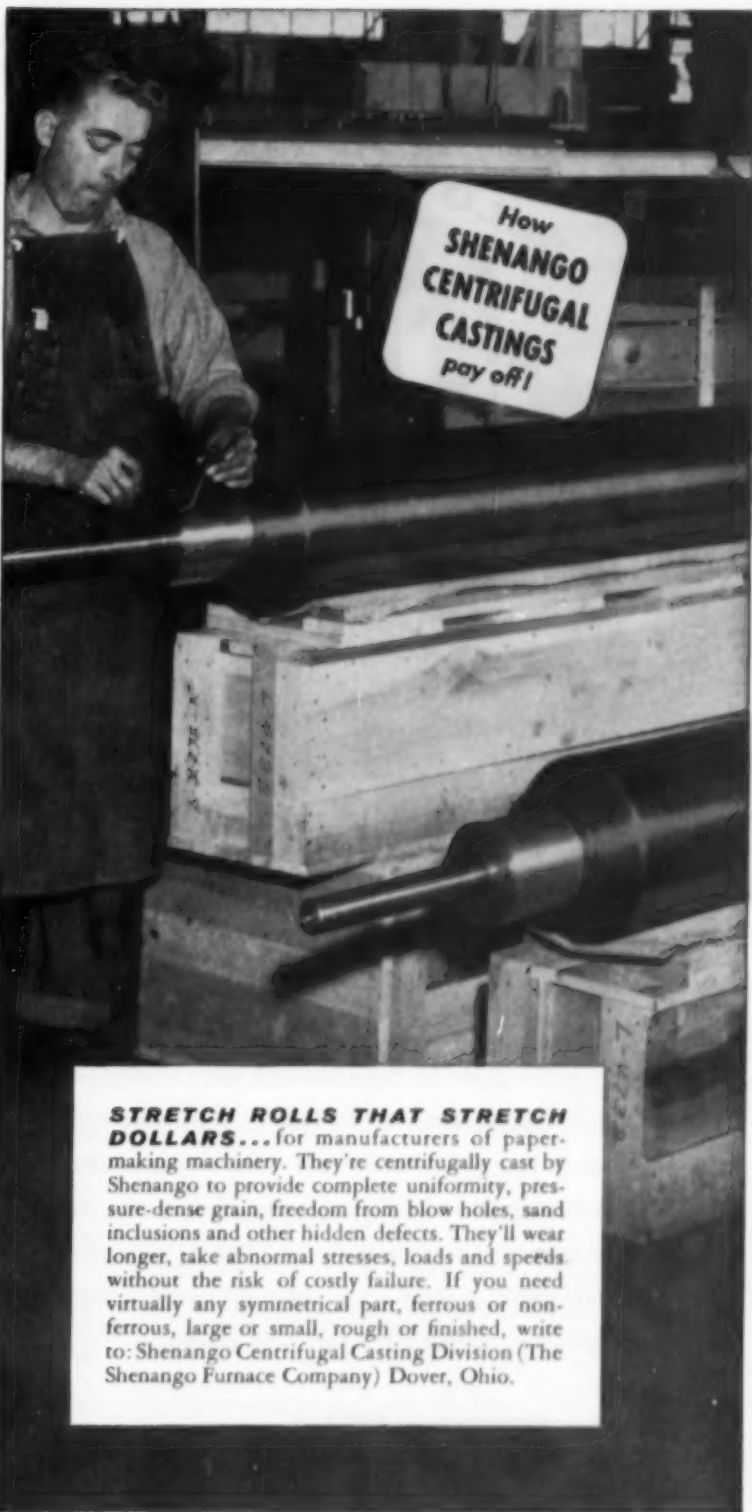


A set of coils from the rewind mandrel is pushed onto the transfer mandrel, which will handle up to 10,000 lb per arm. Coils weighing up to 2000 lb and 50 in. in diameter can be handled. A coil is removed from the mandrel in about 30 seconds. Write: J. C. Busch Co., 158 S. Barclay, Milwaukee 4, Wis. Phone: Broadway 6-1412

Barrel Finishing Agent

FM-183 is an alkaline material that combines fine abrasives with surface active agents to keep the work clean and sharp.

Used in concentrations of 1 to 5 ounces per gallon of water, it is suited for the deburring of stamped or machined parts; grinding off



STRETCH ROLLS THAT STRETCH DOLLARS... for manufacturers of paper-making machinery. They're centrifugally cast by Shenango to provide complete uniformity, pressure-dense grain, freedom from blow holes, sand inclusions and other hidden defects. They'll wear longer, take abnormal stresses, loads and speeds without the risk of costly failure. If you need virtually any symmetrical part, ferrous or non-ferrous, large or small, rough or finished, write to: Shenango Centrifugal Casting Division (The Shenango Furnace Company) Dover, Ohio.

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COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
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*Here's an Annealing Retort
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35% Ni—15% Cr
30" Diameter 30' Long*

Duraloy is the place to come for high alloy castings—
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Castings to your specifications are a Duraloy specialty.

We are equipped to do large and small work. We
can turn out single static castings of 7 tons or more and
single centrifugal castings up to about 4½ tons. On your
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Send for Bulletin No. 3354-G

THE DURALOY COMPANY

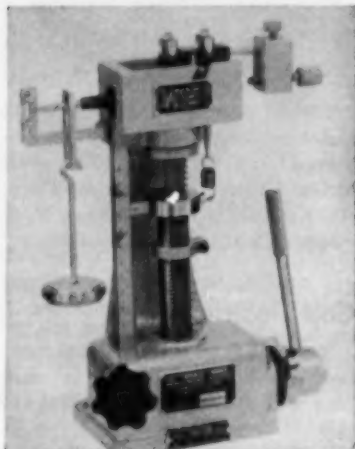
OFFICE AND PLANT: Scottsdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE: 328 South Marquette Avenue

NEW PRODUCTS
and equipment

sharp edges; removing tarnish,
rust and heat scale; improving sur-
face finishes; and deburring steel
and zinc. Write: Oakite Products
Inc., 134E Rector St., New York
6, N. Y. Phone: Whitehall 3-0940

Spring Tester

Small compression and extension
springs are tested for loads and
deflections by this instrument.

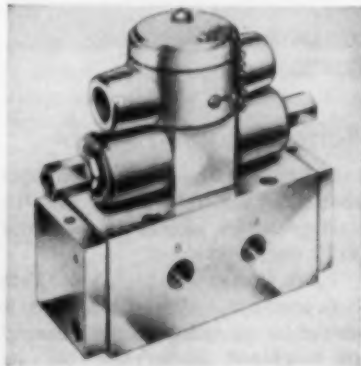


Accuracy is within 0.25 per cent
for springs with capacities from
⅛-oz to 25 lb, lengths up to 5 in.
and diameters up to 1¼-in.

Automatic production - stops
easily adjust for testing at speeds
up to 800 springs an hour. Write:
Carlson Co., 277 Broadway, New
York 7, N. Y. Phone: Barclay
7-2552

Control Valves

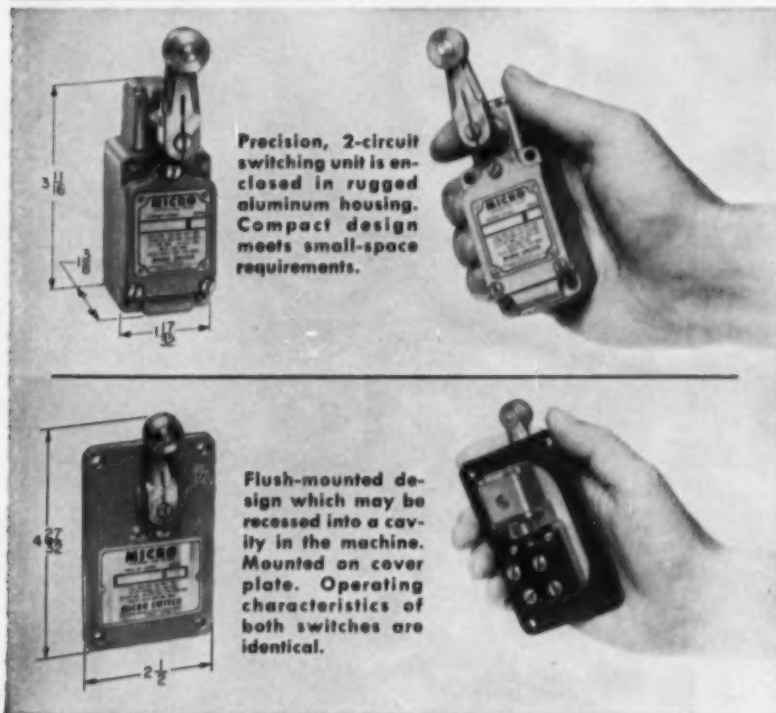
Flo-Line valves are a series of
solenoid and master air units for
controlling air cylinders and other



STEEL

MICRO precision switches

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN



Precision, 2-circuit switching unit is enclosed in rugged aluminum housing. Compact design meets small-space requirements.

Flush-mounted design which may be recessed into a cavity in the machine. Mounted on cover plate. Operating characteristics of both switches are identical.

Here is a small, 2-circuit limit switch to meet a wide variety of machine tool applications

This MICRO precision switch is designed to meet every requirement for a compact 2-circuit switch for use as a limit, safety or interlock switch on complex production equipment.

It has small size, extreme versatility, precision, reliability and ruggedness. All moving parts and the switching chamber are completely sealed, protected from wear or becoming fouled. Versatile field adjustability permits its use in practically any type of application or location.

Two-circuit contact arrangement allows flexibility in circuit design. Reliability of the precision, snap-action unit assures accurate repeat operations throughout many millions of hard, fast actuations. Although small and compact in size, this switch is not only a precision instrument. It is designed and built to stand the most severe abuse.

The electrical rating is: 10 amperes 120, 240 or 480 volts a-c; 1/2 H.P. 115 volts a-c; 1 H.P. 230 volts a-c;

.2 ampere 115 volts d-c; .1 ampere 230 volts d-c; .04 ampere 550 volts d-c. Pilot duty rating is: 600 volts a-c, max.

Like many other precision switches in the MICRO SWITCH line, this versatile 2-circuit switch is also an ideal component for installation on present plant equipment. MICRO precision switches make production machinery safer, more automatic and more productive.

As shown above, this switch is also available in a flush-mounted design which may be recessed into a cavity in the machine. The operating characteristics of both switches are identical.

MICRO precision switches are sold by distributors in key cities everywhere. For engineering assistance, call the MICRO SWITCH branch nearest you.

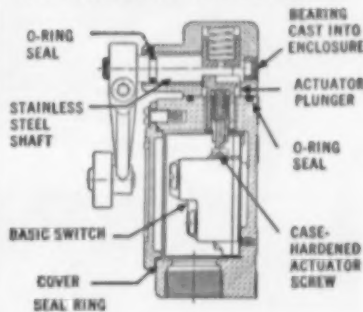
MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS



Seals Provide Maximum Protection



Sealing is provided by use of O-ring seals on the actuator shaft and between the actuator head and the housing. A synthetic rubber ring seal is provided for the cover. These seals provide maximum protection against entrance of dust, oil and other liquids. The switch meets NEMA specifications for an oil-tight pilot device.

Adjustable Head Assembly

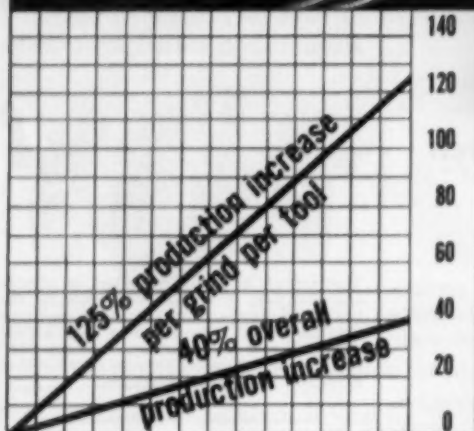
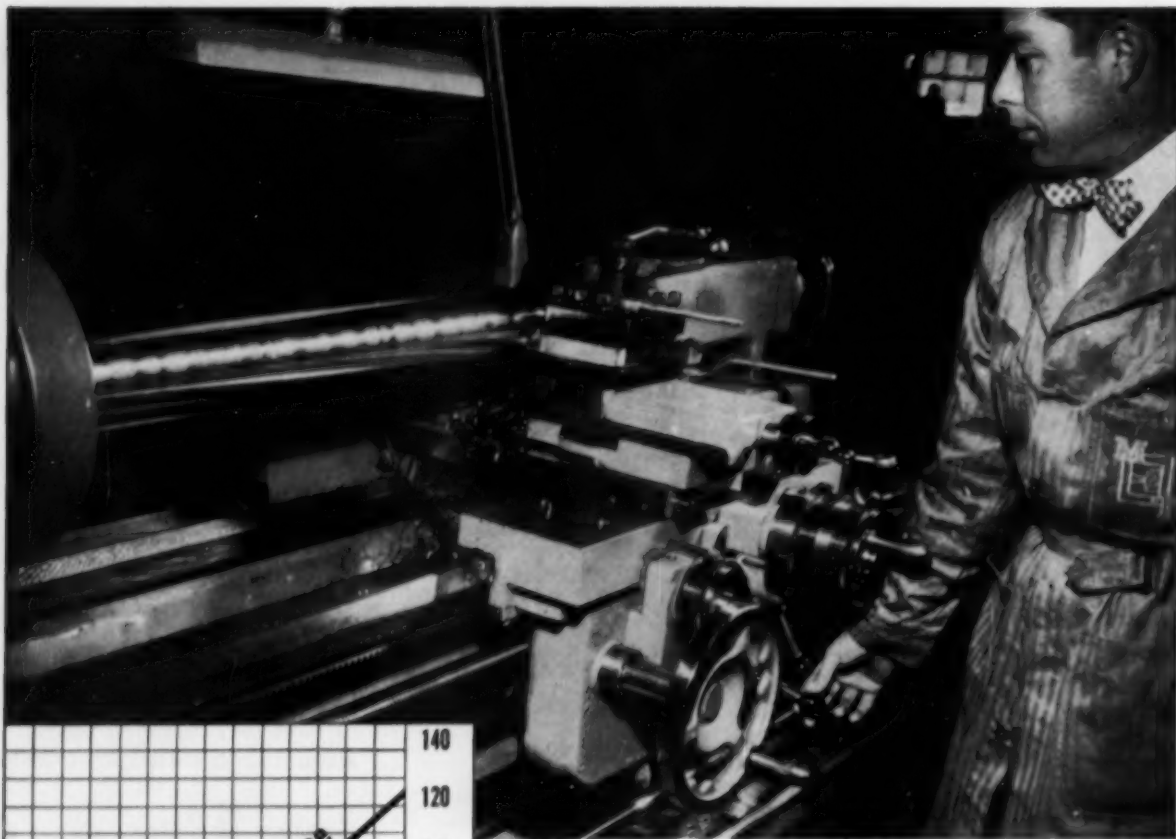


The switch is easily mounted in almost any location. The user can remove the head and locate it in any of 4 positions (as illustrated). The actuator arm is field adjustable to any position through 360° and can be adjusted to operate in either direction or in both directions.

Contact Arrangement

Contact arrangement of the basic switching unit is double-throw, two-circuit, single-pole, double-break. A single-pole, double-throw circuit can be obtained by tying together one normally-open and one normally-closed terminal and using this connection as the common terminal.





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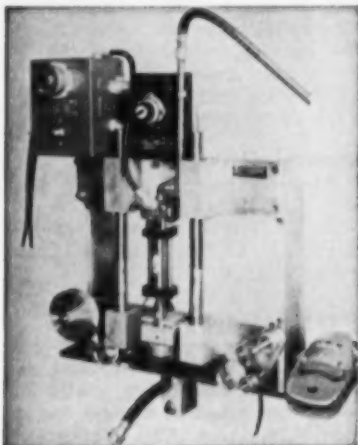
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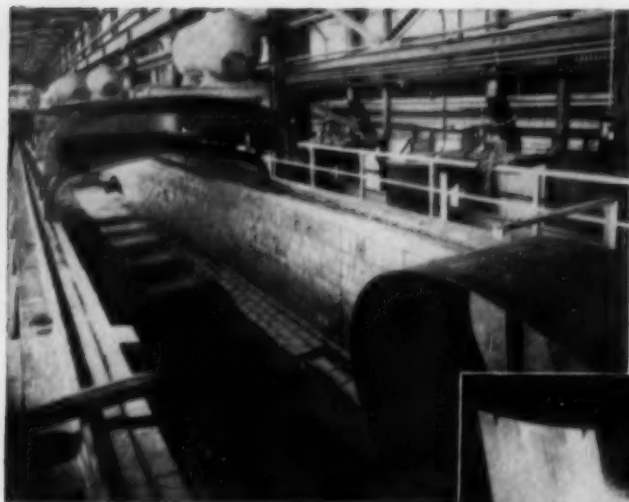
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For a quarter century Atlas has been producing Corrosion-Resistant materials of construction for industry-wide use in combatting corrosion. Atlas, with the advance of technical knowledge, has developed new materials and improved existing products to keep pace with the increasing use of strong pickling agents and higher processing temperatures.

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NEW Literature

Write directly to the company for a copy

Tool Steels

A 4-page brochure discusses uncompensated shrinkage or expansion caused by heat treating. Heat Treating Division, Wiedemann Machine Co., 4272 Wissahickon Ave., Philadelphia 32, Pa.

Sand Preparation

Machines for conditioning and mixing sand are depicted in bulletin 1230, 24 pages. Beardsley & Piper Division, Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Ill.

Drafting Practices

A 56-page booklet gives standards for drafting room practice and simplified drafting. Public Relations Department, American Machine & Foundry Co., 261 Madison Ave., New York 16, N. Y.

Nondestructive Testing

Electronic eddy current and magnetic sensing instruments are described in a 12-page bulletin. Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Ill.

Sheet Descaling

Shotblasting equipment for continuous descaling of hot-rolled and heat treated steel sheets, plates and coils is described in bulletin 608, 16 pages. Pangborn Corp., Hagerstown, Md.

Carbon Steel Tubing

Bulletin TDC-142A, 4 pages, gives data on mechanical and physical properties of seamless and welded carbon steel tubing. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Speed Recorders

Data sheet ND46-27(1), 4 pages, describes recorders for measuring rotational and linear speeds and the tachometer generators used with them. Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

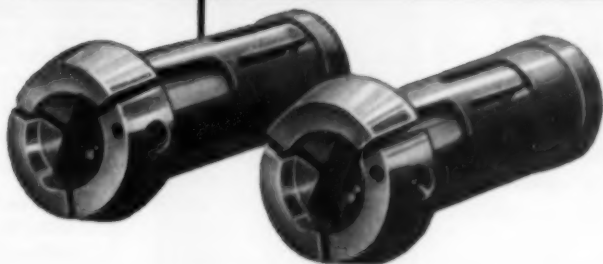
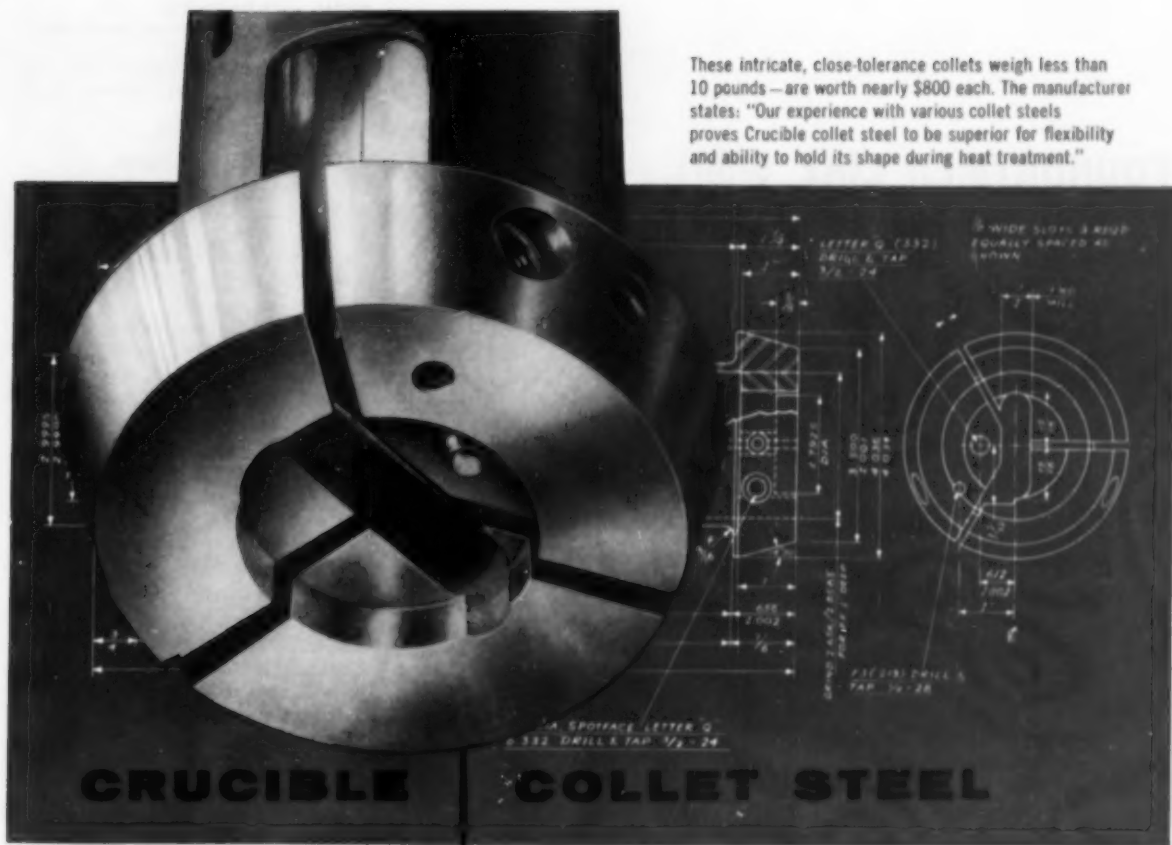
Vibratory Feeders

Base power units, blank cast bowls and fabricated supply hoppers—blank equipment offered to manufacturers developing their own feeders—are presented in bulletin 5631, 8 pages. Vibratory Feeder Co., Erie, Pa.

Pyrometer Indicators

Bulletin 25-3, 8 pages, covers millivoltmeter pyrometer indicators that have permanent magnet moving coils and automatic cold junction compen-

These intricate, close-tolerance collets weigh less than 10 pounds — are worth nearly \$800 each. The manufacturer states: "Our experience with various collet steels proves Crucible collet steel to be superior for flexibility and ability to hold its shape during heat treatment."



for minimum distortion after heat treatment

These collets are used in machining the anchoring end of jet engine turbine blades, while locating the part from reference points on the airfoil section of the blade. It's a job that demands a steel which will not distort during heat treatment. The collet head is heated to Rockwell 58-60 C—the body tempered to 35-38 C.

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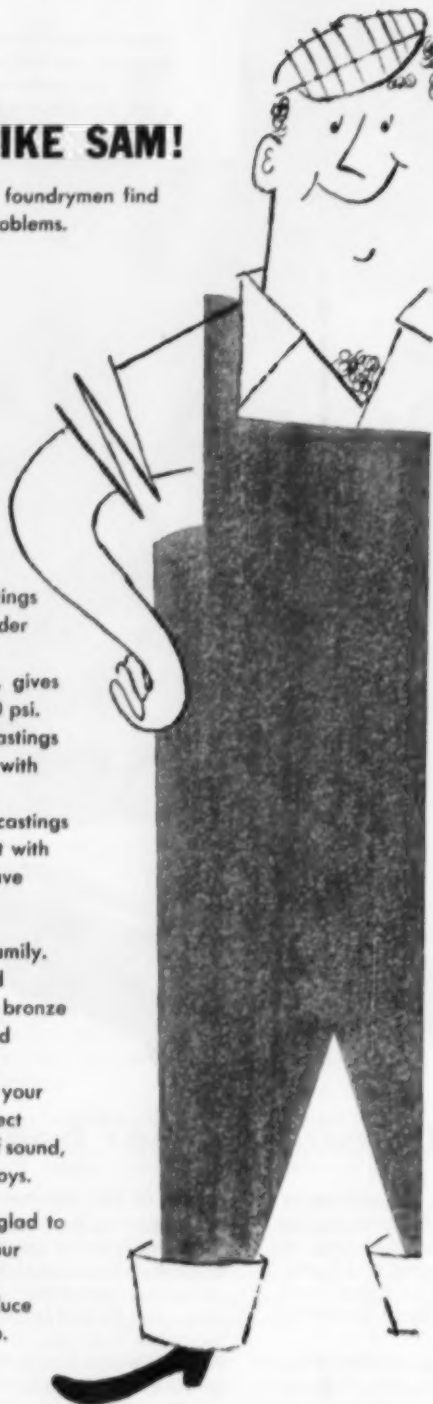
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NEW LITERATURE

sation. Thermo Electric Co. Inc., Rochelle Park Post Office, Saddle Brook, N. J.

Variable Speed Drives

Bulletin 1600-B7 P, 16 pages, describes variable speed drives with touch control. Advertising & Sales Promotion Department, Worthington Corp., Harrison, N. J.

Overhead Conveyors

Bulletin 954, 8 pages, describes ten typical industrial uses of light-weight conveyors. Department NLP, Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4, Mich.

Conveyor Trolleys

Low friction, overhead conveyor trolleys are described in bulletin 56-2. Anchor Steel & Conveyor Co., Dearborn, Mich.

Unloading Machines

Machines for automatic press unloading are depicted in 16-page bulletin. Sahlin Engineering Co. Inc., P. O. Box 289, Birmingham, Mich.

Foundry Data

Cupolas, electric furnaces and transformers, fuels, ladles, melting points, temperatures and weights are included in bulletin FY-175, 48 pages. Whiting Corp., Harvey, Ill.



NEW BOOKS

Cold Bending of Metals, Wallace Supplies Mfg. Co., 1304 Diversey Parkway, Chicago 14, Ill. 98 pages, \$2. The types of machines used for cold bending of tube, pipe and structural shapes are described along with the tools for bending, theory of cold bending and designing for bending.

Abrasive Cut-Machining of Metals, Wallace Supplies Mfg. Co., 1304 Diversey Parkway, Chicago 14, Ill. 64 pages, \$1. Both books, bound together \$2.50.

Capabilities of abrasive machining and causes of failure of abrasive cut-off wheels are described.

Casting Kaiser Aluminum, Kaiser Aluminum & Chemical Sales Inc., 919 N. Michigan Blvd., Chicago 11, Ill. 376 pages.

Advanced methods used in making sound aluminum castings are presented in a well-illustrated book. Casting practices and characteristics of molten aluminum are presented and pig and ingot product data are included.



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For more about these long-lived speed reducers, ask for bulletin 449.

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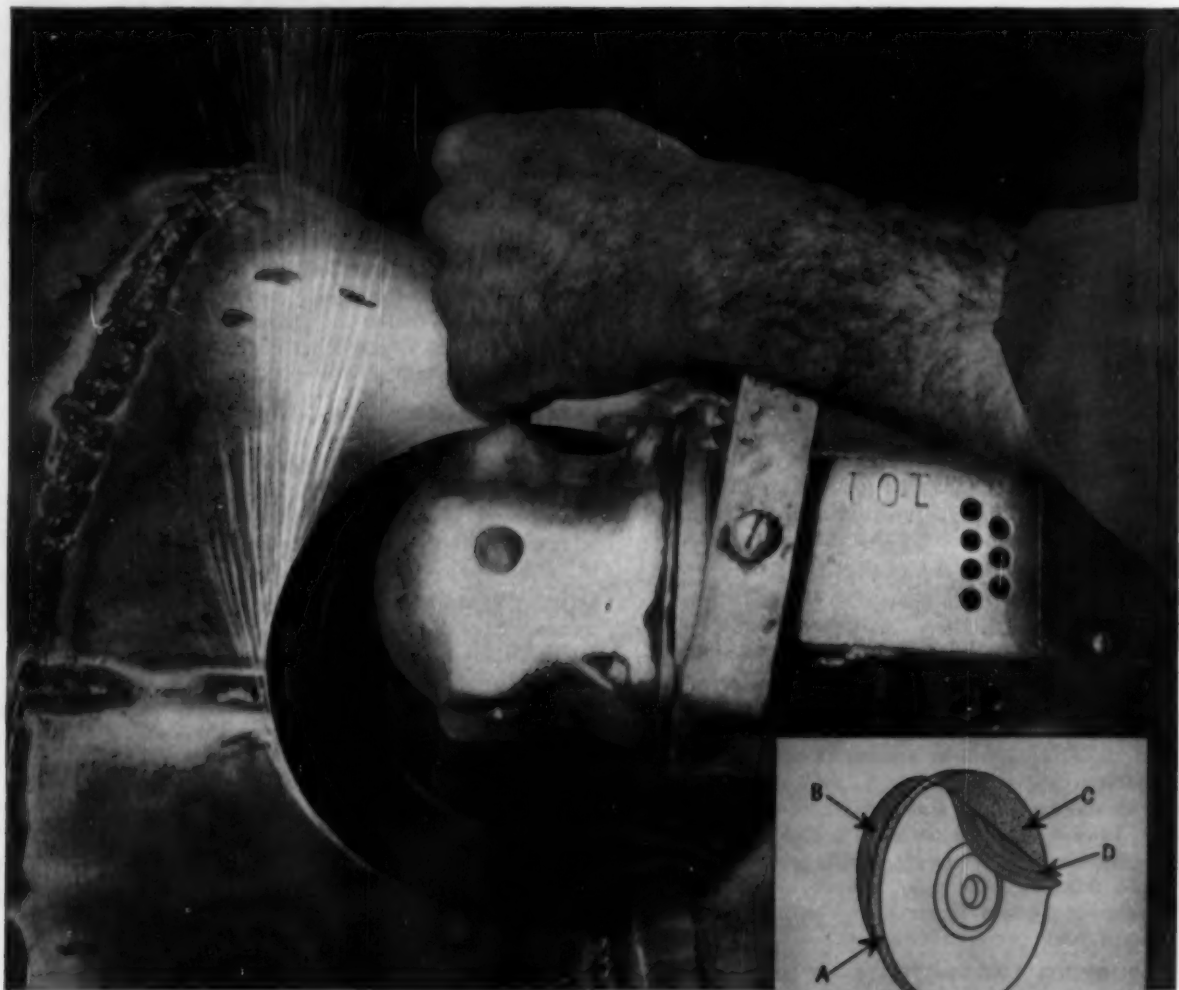
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*Reg. applied for.



Mechanical Goods Division

United States Rubber

Steel Stocks Hit Low Point

(Per cent respondents)

PRODUCT	Inventory Position				
	Virtually nil	Up to 20 days	20-50 days	30-90 days	Over 90 days
Hot-rolled carbon bars	2	15	44	18	21
Cold-finished bars	6	8	45	27	14
Hot & cold-rolled sheets, strip	1	15	31	34	19
Plates, light	7	25	43	15	10
Plates, heavy	31	25	31	3	10
Structural shapes	21	37	26	3	13
Welded tubing	4	8	38	42	8

Legend: Inventories of the average metal user fall in the white blocks

Inventory Boom in Sight

Fourth-quarter outlook: Buyers will be trying to build stocks back to a solid working level, but they will have trouble doing it as production demands stay up

STEEL users have high hopes for weathering the strike recovery period without further production cuts.

The pinch in the next 30 days will be felt the most by heavy plate and structural shape users (see table above). In both cases, at least half the respondents to STEEL's survey on metals say they have a 20-day (or less) supply.

Day for Day—Because a strike's full effects can't be evaluated for months, some purchasing agents are unwilling to go out on a limb with fourth-quarter predictions. Notes one midwestern buyer: "Although we didn't cut production during the strike, eventually we will lose production on a day for day basis, figuring the days the strike lasted past July 20. That's because of our inventory loss of heavy plate and structurals."

A small user of steel reports he has been unable to keep a balanced inventory of steel products for the last year: "Now we are caught between high labor costs on one side

and material shortages on the other. This is the squeeze that almost compels the little guy to quit while he still has his shirt."

Recovery—When the strike ended, most metal users still held inventories sufficient to get them through the recovery period (STEEL, July 30, p. 49). One steel company president reports his firm will be back to capacity operations by about Aug. 14, and other primary producers estimate full production in the third week of August. If the pipeline can be refilled that fast, there will be little trouble among steel users.

A Canastota, N. Y., buyer says he obtained "fairly heavy warehouse fill-ins" during the strike. Buyers around the country agree that they got more steel from the warehouses during the strike than they originally expected. STEEL's first strike survey (STEEL, July 16, p. 81) showed that 55 per cent of the respondents expected to curtail production or close down if the strike went over 45 days.

The later survey cut the percentage that would have been affected to about 30 per cent.

Shortages—Special grades and sizes of many steel products felt the strike's pinch. Seamless tubing for oil producers is extremely short. A Buffalo firm is having a hard time meeting customers' requirements for certain sizes of hot-rolled bars.

A Redwood City, Calif., buyer is shifting from coil to sheet stock for some production. Comments a Hartford, Conn., manufacturer: "Our troubles on deliveries lie in specific sizes usually, not in the commodity in general."

Crux—There's little doubt that an inventory boom will get under way as soon as the steel producers start filling the pipeline. How long will it last?

Here's an indication: "Unless there's a marked poststrike slackening in demand for plates, structurals and wide flange beams, we have no chance of building a working inventory before Jan. 1," says a Shreveport, La., purchasing agent.

Commented a Cleveland buyer: "If by September we can get the steel we originally ordered for July, we're O.K. If we have to wait until October, then there will be trouble—a real fight for steel."

Copper, Aluminum—Half the respondents using copper and aluminum products report inventories in the 30 to 60-day category. In aluminum, there has been a slight shift downward since STEEL's last survey. About 11 per cent of the respondents are holding a ten-day (or less) supply.

Steel Bars . . .

Bar Prices, Page 163

Carbon bar producers may not start to set up fourth quarter schedules for another two weeks or so. By that time, they are likely to have a much better idea of what their carry-overs from the third quarter will be.

Producers of cold-drawn bars have long since opened their books for tonnage to be shipped in the closing quarter of the year. They report lively consumer interest in that delivery position.

Most consumers were able to weather the steel strike without

too much difficulty. Their inventories, except possibly for some of the larger sizes, were sufficient to carry most fabricating shops through the strike period and should be sufficient to support their operations through the post-strike adjustment.

Generally, fabricators do not expect deliveries to increase much for a week or ten days after mills resume production. Hot-rolled bar supply is noticeably tighter than it was at the start of the strike, according to Pittsburgh makers.

Stainless Steel . . .

Stainless Steel Prices, Page 167

Users of stainless steel continued to obtain requirements during the strike period, according to Pittsburgh area producers. Several smaller suppliers operated throughout the strike.

Fabricators' inventories ranged as high as 90 days, except in nickel-bearing stainless. The shortage of nickel continues to hinder fabricators more than the effects of the strike.

Outlook for stainless sales to automotive interests is brightened by the estimate of T. S. Fitch, president, Washington Steel Corp., that auto builders will use an average of 52 lb of stainless steel in each 1957 model, compared with an average of 46 in 1956 models.

Tin Plate . . .

Tin Plate Prices, Page 165

Canmakers bolstered their inventories of tin plate prior to the strike, and mills are pretty clean of tonnage. The pressure will be on for production, especially since consumers are expected to actively enter the market for additional tonnage in anticipation of a price advance when current six-month contracts expire in the fall. Because of the general wage advance and the uptrend in prices, canners are getting in as much tin plate as they can. They believe they will have to pay more under new contracts.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 161 & 163

It will take the sheet mills at least ten days after the strike to get back into stride. Pittsburgh interests think it will take ten days to reach 80 per cent operations, two weeks before full capacity is attained.

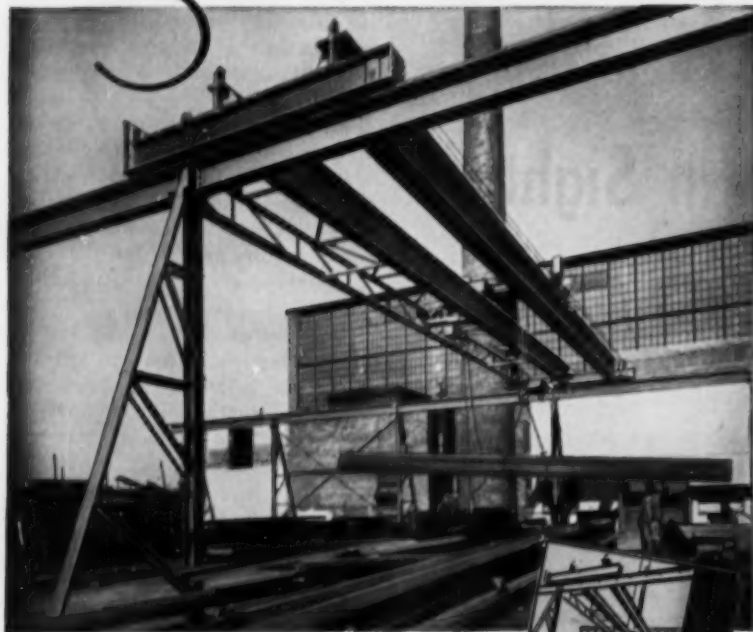
Stocks of semifinished steel are low. They must be rebuilt before sheet mills can operate full schedules.

Demand pressure from consumers is expected to show a marked pickup, compared with that prior to the strike. Consumers' stocks have been substantially reduced since start of the work stoppage. Few users were pinched for supplies during the strike.

The mills, of course, will be called upon to give preference to government-rated orders, which run from virtually zero in some products to possibly 15 per cent in others, say plates and shapes. Perhaps only 5 to 6 per cent of all steel produced is rated on defense account.

Indications are most sheet-makers will not press for fourth quarter bookings until the outlook for production and third quarter carry-over tonnage is clearer. Some

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fourth quarter business has been booked. One Pittsburgh area firm reported it has no open space in schedules until December.

An Ohio sheetmaker will be delayed getting back into capacity sheet production. It is committed to produce 35,000 tons of 1/4-in. plates on its continuous mill. The order was booked before the strike, and must be taken care of before the mill can swing over to sheets.

Calstrip Steel Corp., Los Angeles, advanced prices on low carbon, cold-rolled strip to \$8.90.

Cold-rolled sheet bookings extend 90 days ahead in the case of the St. Louis area producer. This maker's galvanized sheet facilities are engaged at capacity, but its backlog is not heavy. Bookings of enameling sheets are normal.

Plates . . .

Plate Prices, Page 163

Most platemakers who were behind on commitments before the steel strike began estimate they will be behind at least six or seven weeks by the time their operations get back to normal.

Some figure the strike will cost them at least two months' production.

All agree they will have demand for far more tonnage than they can handle well through next winter and beyond. Some plate users, such as railroad equipment builders, had to cut schedules because of short plate supplies.

Lukens Steel Co., Coatesville, Pa., was the first struck plant in the Philadelphia area to get back into production. Its men started returning July 30, and 8 of 12 openhearth and four of its rolling mills were operating within a few days of the ending of the strike.

The two eastern plate mills which operated through July because their labor contracts did not expire expect to continue operations without interruption. These mills, one at Conshohocken, Pa., and the other at Harrisburg, Pa., are expected to come to terms with their employees on the same basis as other mills.

An Ohio sheetmaker booked 35,000 tons of 1/4-in. plates for rolling on its continuous mill prior to the strike. Sheet production will be delayed until the plate order is completed.

Plate production has been increased about 15 per cent by Granite City Steel Co., which also reports some conversion of stockpiled ingots, mostly plates. Adding to the pressure on plate supply is the set-aside ordered by the government for defense requirements.

Tubular Goods . . .

Tubular Goods Prices, Page 167

Pipe mills are likely to swing back into production quickly once

details of labor agreements with separate producers are worked out. This is taking more time than had been expected. Chances are, most idled mills will not be in full production for ten days or so.

Output of high-alloy tubular goods is likely to continue curtailed by the shortage of semifinished alloy steel. Production of casing is not likely to be back to normal until ten days or more after ingot production is resumed.

Tubemakers had fabricated all

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WELD WITH **ARCOS** 

STAINLESS ELECTRODES

Processing certain foods in equipment such as this corn germ separator often releases acid by-products. These by-products, although weak, often corrode the equipment and contaminate the food unless the equipment is made of the "right" stainless. For welding the trough and agitator sections, two types of ARCOS Electrodes were used—Chromend KMo and Chromend 25/20 Mo respectively. These electrodes meet all the essentials: trouble-free welding, unbroken weld performance in service, and freedom from contamination. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.



available semifinished steel and shipped it out before July 1, so tube mill stocks will have to be built up considerably above present levels. Tube shipments, in all likelihood, will be under normal for several weeks.

Sales agencies for cast iron pipe report little new inquiry is circulating, following the heavy purchases during June just prior to a rise in prices. Resumption of buying interest is expected within the next 30 days, with more municipal business in prospect.

Warehouse . . .

Warehouse Prices, Page 168

Distributors are waiting for new price schedules from mills before making changes in their prices.

They are turning down considerable inquiry for plates and shapes, pending resumption of shipments from mills. They believe it will be a long time before they will be able to fully meet requirements for these products.

While inventories generally are fairly good, "bread and butter" items are about exhausted. Every effort is being made to spread stocks as far as possible and to satisfy the needs of regular customers. Replacements are not expected in volume within three months.

Warehouses in the Pacific Northwest experienced less pressure from their customers last week as resumption of operations at the mills was expected momentarily. Potential demand is strong.

Wire . . .

Wire Prices, Pages 165 & 166

Wiremakers will not be able to build up large enough stocks of steel to produce all varieties of their products for at least two weeks after the end of the steel strike, states a major Pittsburgh area producer.

The first steel produced in the open hearths when the mills resumed will not be of much use. Indications are that it will take several days for wire mills to rebuild their depleted stocks of semifinished. Shipments of wire from mills that were closed by the strike

STEEL

will be relatively low until mid-August.

Fabricators have not suffered from wire shortages during the strike. Their stocks were high when it started. Many wiremakers also continued to operate on extended labor contracts or under agreements that extended through July and beyond.

Mills have received a few orders for fourth quarter delivery. Demand in the third quarter has been light. Auto builders' needs for manufacturers wire have been slow to develop. A pickup in buying is expected this month.

Navy, general stores supply office, Philadelphia, has estimates on approximately 825 tons of steel welding electrodes, delivery, east and west yards; bulk is covered manual shielded arc, end grip type. Same agency closes Aug. 16 on 348,400 ft of improved plow steel wire rope.

Iron Ore . . .

Iron Ore Prices, Page 170

Shipments of Lake Superior iron ore in the week ended July 30 totaled only 286,452 gross tons, reports the Lake Superior Iron Ore Association. This compares with a normal midsummer weekly total of more than 3 million tons. Most of the lake iron ore fleet has been tied up during the steel strike.

Cumulative shipments in the 1956 shipping season to July 30 were 33,737,374 tons. A year ago on the same date the total was 40,911,432 tons.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 163

Concrete reinforcing steel bar demand is heavy, notably for power plant and industrial expansion in the New England district where new contracts exceed 5000 tons.

Prices for bars in place are higher in the area. Deliveries are becoming extended, it is reported.

Piling bookings are heavy, with shipments extending more than one year. For some bridge construction bearing piles are in the most critical supply of the heavy building steel products.

Two independent reinforcing bar mills in the Pacific Northwest have added heavily to their order back-

More proof . . . how to get consistent results from submerged arc welding



*Courtesy of CF Braun & Co
Engineers and Constructors, Alhambra, California*

WELD WITH **ARCOS**

STAINLESS COILED WIRE

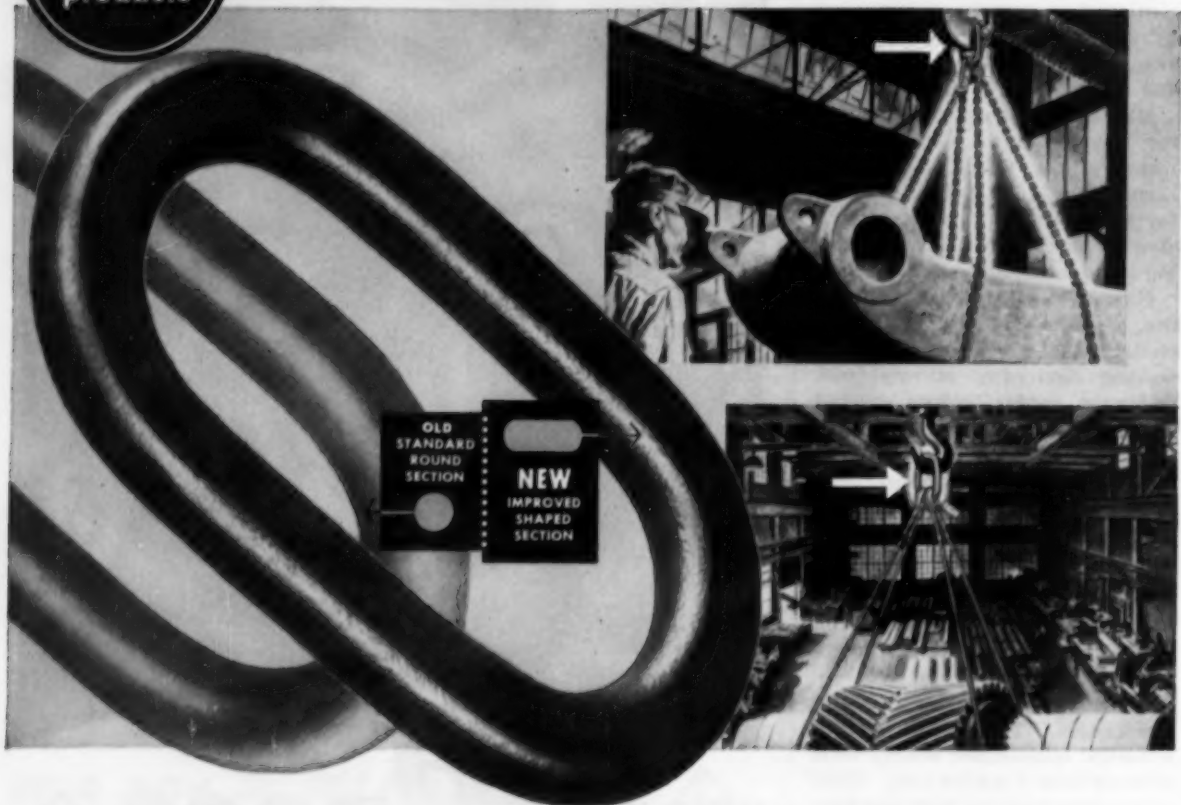
Unfailing strength and resistance to corrosion at elevated temperatures are vital in the welds of this massive 14 ft. diameter, 30 ft. long catalyst pressure vessel. All seam welding of the 1% Chrome 1/2% Moly plate was submerged arc welded with Arcos Chromar welding quality wire. Arcos Chromar wire—like every Arcos filler metal product—can be used with confidence on the most critical jobs. Start with Arcos and be sure of uniform dependable weld metal—from start to finish. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.





ACCO Registered* Slings—Wire Rope & Chain

THE STANDARD OF EFFICIENCY AND SAFETY



New Master Link for Slings—Either Chain or Wire Rope— Holds Its Form Under Loads Up to 18% Greater

• Latest product of the continuing research behind ACCO Registered Slings is this new Shaped Section Master Link. ACCO's engineers found that by shaping the link—as shown above—they could give it more "dimensional stability"—a better "section modulus." Translated into layman's English this means that the new shaped link, without any increase in weight, will withstand deformation under loads up to 18% greater than a standard round section link will.

Just as shaping a quantity of metal into a structural I-Beam allows it to handle greater loads than it could as a solid beam, so does ACCO's Shaped Section Master Link give better performance under greater loads than a link with a round section.

The new shaped link is smoother and provides a greater factor of safety. It is a better and safer link.

It costs us more to make. But it will be offered on all ACCO Registered Slings—both wire rope and chain—at no increase in price.

AN EXTRA BONUS OF SAFETY

This latest technological advance adds an extra bonus of safety to ACCO Registered Slings.

Each component of an ACCO Registered Sling is made from the best materials procurable for its use. Each part must prove to have strength equal to or greater than the sling body. All hooks for ACCO Registered Slings are Magnaflux tested. Then

these components are assembled into slings according to carefully engineered designs that have proved themselves in rigorous field tests.

The completed sling is then individually proof-tested to twice the working load limit. Then and only then, is it awarded the coveted ACCO Registration Certificate and the identifying ring or tag.

SEE YOUR DISTRIBUTOR

ACCO Registered Slings are readily available from a distributor near you. If you don't know him write to our Bridgeport office for his name.

*Trade Mark Registered



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Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles,
New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore.,
San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.



STEEL

logs over the past month. Northwest Steel Rolling Mills Inc., Seattle, last week booked in excess of 2000 tons. Many other awards are pending, a number of tonnages having been held back until clarification on the labor situation.

The two Pacific Northwest plants that operated through the strike (their labor agreements did not expire until July 31) anticipated no labor difficulty.

May Build Grinding Ball Mill

National Malleable & Steel Castings Co., Cleveland, may build a plant at the head of the Great Lakes to produce grinding balls. Markets: Ball mills handling taconite and copper ore processing plants in that area.

McDaniel Enlarges Facilities

McDaniel Refractory Porcelain Co., Beaver Falls, Pa., manufacturer of industrial ceramics, completed a \$125,000 expansion program. Additions were built to the manufacturing and office areas. New facilities include: A tunnel kiln, precision grinding equipment, conveyors and handling systems for products and raw materials.

Pig Iron

Pig Iron Prices, Page 168

Pressure on merchant pig iron, foundry iron in particular, has eased slightly. The incentive to pile tonnage is gone now that the steel strike is over.

Consumption has been low because of vacations. July wound up as a dull month for pig iron sales. August seems likely to show only a moderate pickup.

Reopening of shops will boost the melt. Most sellers anticipate fairly good activity as they expect an over-all shortage of most metals for some time.

In the Buffalo district, one large foundry is closed by a strike, and others appear to have adequate supplies of iron. Little merchant iron is expected to be available from mills because of the anticipated tight situation in iron ore and shortage of prime industrial scrap. Mills are expected to use most of their iron output in their open hearths.

The Marketing Committee of the Gray Iron Founders' Society

plans a program to improve marketing practices and enlarge the over-all market for gray iron castings. Data will be obtained from design engineers, sales executives, purchasing agents, foundries and the public. Results will be discussed at regional sales clinics of the society.

Donald H. Workman, executive vice president of the society, says the industry's marketing has not kept pace with technological development. The program is designed to close this gap.

William S. Thomas, vice president, Emmaus Foundry & Machine Co., Emmaus, Pa., is chairman of the committee.

Structural Shapes . . .

Structural Shape Prices, Page 163

Even though the strike is over and some shape tonnage is moving (it was ready to ship from mills when the work stoppage started), some fabricators may still have to close down temporarily because of unbalanced steel stocks. Others must keep tapering their operations until the shape producers get back into stride.

Some trade interests think this may take the mills at least two to three weeks.

Fabricators appear reconciled to the fact they will have to set back their fabricating schedules for some time. Field work will also be set back—in some cases, it will have to be brought to a halt.

A heavy amount of inquiry is reported accumulating. Important contracts, especially those involving the long range projects, should develop soon.

Pittsburgh interests say structural steel will not be available to construction companies in fabricated form for several weeks. It will require one week to ten days from the strike settlement before structural shipments will be back to anything like normal. Since fabricator stocks of steel are thin, they must wait for mill deliveries before stepping up operations.

Due to anticipated delays, users of structurals are pessimistic about steel supply the rest of this year. They think the current shortage will extend into 1957.

An award of 2000 tons of shapes

for the City-County building, Tacoma, Wash., is expected to go shortly to a Seattle fabricator.

Public works, state road projects and sizable industrial jobs involving large structural tonnage, are reported pending in the Pacific Northwest. Area fabricators, while running low on steel supplies, hope the strike settlement will enable them to continue to operate close to capacity without interruption.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2500 tons, superstructure, lift bridge Tule Lake ship channel, Corpus Christi, Tex., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

1800 tons, newspaper plant, Washington Star Newspaper Co., Washington, to Bethlehem Steel Co., Bethlehem, Pa.; Charles H. Tompkins Co., Washington, general contractor.

1200 tons, Morrison street bridge, Portland, Oreg., to Independent Iron Works, Oakland, Calif.; Donald M. Drake Co., Portland, is general contractor.

850 tons, junior high school, Dallastown, Pa., through Ritter Bros., Harrisburg, Pa., general contractor, to the Milton Steel & Supply Co., Milton, Pa.

500 tons, high school, Edmonds, Wash., to Pointer-Willamette Co. Inc., Edmonds, Wash.; Dahlgan Construction Co.; Seattle, general contractor.

425 tons, high school, Greenfield, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; E. J. Penney Co., Springfield, Mass., general contractor.

STRUCTURAL STEEL FENDING

510 tons, deck framing, etc., Rocky Reach dam, Wenatchee, Wash.; bids to Chelan county PUD No. 1, Aug. 24.

450 tons, Washington state Skykomish river bridge, Snohomish county; American Bridge Construction Co., Tacoma, Wash., awarded at \$515,870.

420 tons, railroad relocation bridge, Eagle Gorge project, near Seattle; also involves 1000 ft of steel H-piling; State, Hall, Hamilton, Portland, Oreg., joint low bidders at \$4,074,510 to U. S. Engineer, Seattle.

110 tons, also 70 tons of reinforcing, Washington state undercrossing, Thurston county; bids to Olympia, Wash., Aug. 14.

100 tons, also 50 tons of reinforcing, Washington state railroad bridge, Adams county; bids to Olympia, Wash., Aug. 14.

100 tons, public utility warehouse, Ketchikan, Alaska; Arrow Iron & Machine Works, Seattle, is low bidder at \$44,969.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2400 tons, newspaper plant, Washington Star Newspaper Co., Washington, to Bethlehem Steel Co., Bethlehem, Pa.; Charles H. Tompkins Co., Washington, general contractor.

2000 tons, power plant addition, Mystic Station, Boston Edison Co., to Bethlehem Steel Co., Bethlehem, Pa.

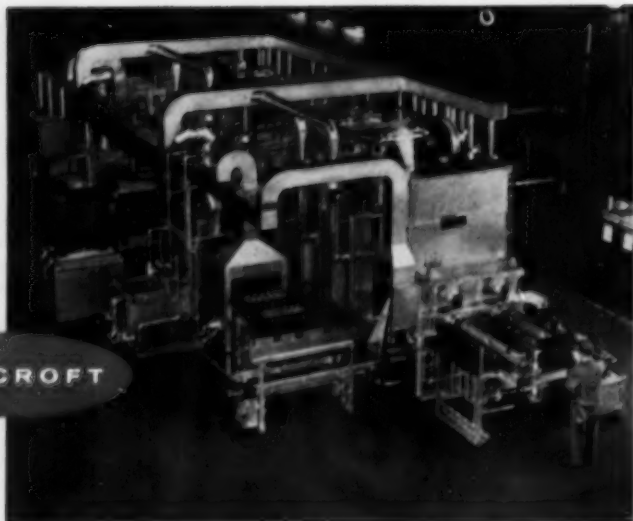
1800 tons, steel piles to Bethlehem Steel Co., Bethlehem, Pa.; also 2085 tons of fabricated structural steel to Bethlehem Steel Co.

1350 tons, Ft. Lewis, Wash., barracks to Northwest Steel Rolling Mills Inc., Seattle; Donald M. Drake Co., Portland, Oreg., general contractor.

1075 tons, grade separations and bridges, Connecticut turnpike project 328-01, Ledyard-Griswold-Plainfield, to Truscon Steel Divi-

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THE
HEAT
TREAT
TRAIL—
WITH

HOLCROFT

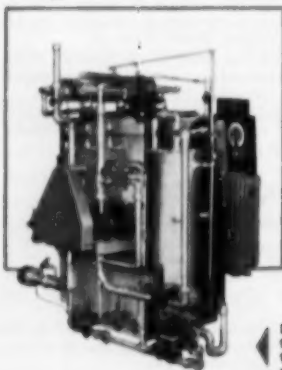


LET'S TALK CONTROLLED ATMOSPHERES

Holcroft has pegged many of its research activities to the problems of controlled atmosphere heat treating. As a result, Holcroft has blazed the trail for industry.

Controlled atmospheres protect the stock while it is being treated and help produce the desired finish to the parts. Scale and decarburization are eliminated. Stock in the furnace chamber is surrounded by a gas atmosphere which excludes all air and products of combustion.

Basic gas generator patents go back to 1883. However, the first real use and understanding of fundamental equilibrium constants—now in general use in all gas atmosphere work—was by Holcroft in 1934. Dew point cups and equilibrium curves were furnished customers at that time. Today, Holcroft's new Lo-Dew generator (750, 1200 and 2400 cfh) provides rated capacities at low dew points.

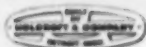


Holcroft's new gas generator designed to produce gas atmospheres between the limits of perfect combustion and modified "302".

Advances like these are typical of the scope of Holcroft activities—proof that you can get right answers without prejudice. Insist upon a Holcroft quotation as your first step when you have a heat treat problem. You'll save!

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CHICAGO, ILL. • CLEVELAND, OHIO • DARIEN, CONN. • HOUSTON, TEXAS • LOS ANGELES, CALIF. • PHILADELPHIA, PA.
CANADA: Walker Metal Products, Ltd., Windsor, Ontario

ston, Republic Steel Corp., Boston, through Brunell Construction Co., Southington, Conn., and M. A. Gammino Construction Co., Providence, R. I., joint contractors.

1650 tons, newspaper plant, Boston Globe, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Boston, general contractor.

795 tons, grade separations, Connecticut turnpike project 230-01, Plainfield-Killingly, to Bethlehem Steel Co., Bethlehem, Pa., through Brunell Construction Co., Southington, Conn., and M. A. Gammino Construction Co., Providence, R. I., joint general contractors.

700 tons, addition to the University of Washington men's dormitory, Seattle, to Northwest Steel Rolling Mills Inc., Seattle; John H. Seilen Construction Co., Seattle, is general contractor.

600 tons, John Wanamaker store in Philadelphia suburb, through the Turner Construction Co., Philadelphia, to the U. S. Steel Supply Division, U. S. Steel Corp., Pittsburgh.

478 tons, Morrison street bridge, Portland, Oreg., to Mercer Steel Co., Portland, Oreg.; Donald M. Drake Co., Portland, general contractor.

475 tons, manufacturing plant, Polaroid Corp., Waltham, Mass., to Concrete Steel Co., Boston; Aberthaw Construction Co., Boston, general contractor.

425 tons, Filene shopping center, Peabody, Mass., to U. S. Steel Supply Division, U. S. Steel Corp., Cambridge, Mass.; Aberthaw Construction Co., Boston, general contractor.

340 tons, high school, Greenfield, Mass., to Joseph T. Ryerson & Son Inc., Boston; E. J. Penney Co., Springfield, Mass., general contractor.

160 tons, manufacturing plant, Hersey Mfg. Co., Dedham, Mass., to Concrete Steel Co., Boston; Aberthaw Construction Co., Boston, general contractor.

100 tons, bars and structurals, additional space, industrial park, Natick, Mass., to Concrete Steel Co., Boston, and Karl Koch Erecting Co.; George A. Fuller Co., Boston, general contractor.

75 tons (including 38 tons of shapes to Arrow Iron & Machine Works, Seattle) Sedro-Woolley High School, Washington, to Soule Steel Co., Seattle; Wick Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

340 tons, state bridge work, Washington county, Pennsylvania, bids Aug. 31; figures also were asked on precast reinforced concrete.

150 tons, two municipal wading pools; bids to Yakima, Wash., Aug. 7.

145 tons, railroad bridge, Eagle Gorge dam project, near Seattle; general bids in.

110 tons, Washington state highway projects, Spokane, Wash., Chelan and Mason counties; bids to Olympia, Aug. 14.

PLATES . . .

PLATES PLACED

Unstated, 3 miles of 24 and 30-in. diameter steel and concrete cylinder pipe, plates $\frac{1}{2}$ or $\frac{3}{4}$ -in., Mercer Island water supply line, to American Pipe & Construction Co., Portland, Oreg.; Harbor Construction Co., Seattle, general contractor.

PLATES PENDING

3000 tons, new or used sheet steel piling, Rocky Reach dam; bids to Chelan county PUD No. 1, Wenatchee, Wash., Aug. 24.

200 tons, elevated steel water tank; Pittsburgh DesMoines Steel Co., Seattle, is low at \$173,755 to Richmond, Wash.

RAILS, CARS . . .

RAILROAD CARS PLACED

Columbus & Greenville, 100 fifty-ton boxcars, to Pullman-Standard Car Mfg. Co., Chicago.

Florida East Coast, 100 seventy-ton gondolas, to Magor Car Corp., New York.

Genesee & Wyoming, one caboose car, to International Railway Car Co., Kenton, O.

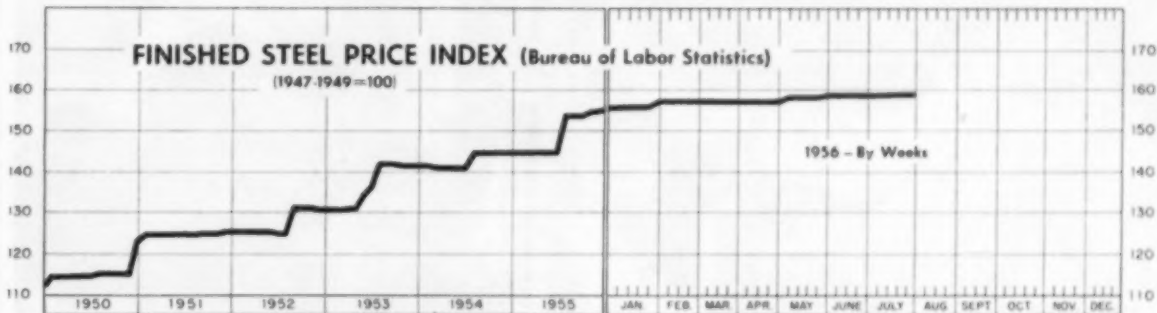
Great Northern, 25 air dump cars, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

RAILROAD CARS PENDING

Hudson & Manhattan Railroad Co., fifty air-conditioned passenger cars; bids asked Sept. 12.

STEEL

Price Indexes and Composites



July 31, 1956 **158.5** Week Ago **158.5** Month Ago **158.2** July Avg. **158.5** Year Ago **153.9**

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 31

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1 ...	\$4.800	Bars, Reinforcing	5.313
Rails, Light, 40 lb	6.217	Bars, C.F., Carbon	9.000
Tie Plates	5.625	Bars, C.F., Alloy	12.375
Axles, Railway	8.350	Bars, C.F., Stainless, 302	
Wheels, Freight Car, 33		(lb)	0.475
in. (per wheel)	52.50	Sheets, H.R., Carbon	5.345
Plates, Carbon	5.200	Sheets, C.R., Carbon	6.214
Structural Shapes	4.987	Sheets, Galvanized	7.770
Bars, Tool Steel, Carbon		Sheets, C.R., Stainless, 302	
(lb)	0.460	(lb)	0.590
Bars, Tool Steel Alloy, Oil		Sheets, Electrical	10.175
Hardening Die (lb) ...	0.560	Strip, C.R., Carbon	8.486
Bars, Tool Steel, H. R.		Strip, C.R., Stainless, 403	
Alloy, High Speed W		(lb)	0.453
6.75, Cr 4.5, V 2.1, Mo		Strip, H.R., Carbon	5.550
5.5, C 0.60 (lb)	1.185	Pipe, Black, Butt-weld (100	
Bars, Tool Steel, H.R.,		ft)	16.997
Alloy, High Speed W18,		Pipe, Galv., Butt-weld (100	
Cr 4, V 1 (lb)	1.650	ft)	21.137
Bars, H.R., Alloy	9.475	Pipe, Line (100 ft)	170.038
Bars, H.R., Stainless, 303		Casing, Oil Well, Carbon	
(lb)	0.450	(100 ft)	165.120
Bars, H.R., Carbon	5.500	Casing, Oil Well, Alloy	
		(100 ft)	204.030

Tubing, Boiler (100 ft) ...	41.530	Black Plate, Canmaking	
Tubing, Mechanical, Car-		Quality	7.133
bon (100 ft)	21.360	Wire, Drawn, Carbon, ...	8.570
Tubing, Mechanical Stain-		Wire, Drawn, Stainless,	
less, 304 (100 ft)	178.897	430 (lb)	0.590
Tin plate, Hot-dipped, 1.25		Nails, Wire, 8d Common ..	6.537
lb	9.333	Wire, Barbed (30-rod spool)	7.847
Tin Plate, Electrolytic,		Woven Wire Fence (20-rod	
0.25 lb	8.033	roll)	18.635

STEEL'S FINISHED STEEL PRICE INDEX*

	Aug. 1 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100) ...	210.45	210.45	210.45	207.63	171.92
Index in cents per lb	5.701	5.701	5.701	5.625	4.657

STEEL'S ARITHMETICAL PRICE COMPOSITES

	Aug. 1 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT*	\$131.27	\$131.27	\$129.18	\$127.41	\$106.32
No. 2 Fdry Pig Iron, GT ..	61.09	61.09	60.56	58.99	52.54
Basic Pig Iron, GT	60.11	60.11	59.80	58.49	52.16
Malleable Pig Iron, GT ...	61.63	61.63	61.27	59.77	53.27
Steelmaking Scrap, GT ...	53.17	47.50	45.83	43.17	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 1 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.05	4.05	4.05	4.05	3.70
Bars, H.R., Chicago	4.05	4.05	4.05	4.05	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.90	4.20
Bars, C.F., Pittsburgh	6.25*	6.25*	6.25*	5.90	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.60	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.60	3.65
Shapes, deld. Philadelphia ...	5.90	5.90	5.90	4.88	3.91
Plates, Pittsburgh	4.50	4.50	4.50	4.50	3.70
Plates, Chicago	4.50	4.50	4.50	4.50	3.70
Plates, Coatesville, Pa.	4.50	4.50	4.50	4.50	4.15
Plates, Sparrows Point, Md. .	4.50	4.50	4.50	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh ...	4.325	4.325	4.325	4.325	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.325	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	5.325	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	5.325	4.35
Sheets, C.R., Detroit 5.325-5.425	5.325-5.425	5.325-5.425	5.325-5.425	5.325-5.425	4.55
Sheets, Galv., Pittsburgh ...	5.85	5.85	5.85	5.85	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.325	3.70-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.325	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	6.317	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	6.35-6.45	4.90
Strip, C.R., Detroit	6.35	6.35	6.35	6.35	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	6.25	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	7.60	5.90-6.20
Tin plate (1.50 lb.) box, Pitta.	\$9.85	\$9.85	\$9.85	\$9.05	\$8.70

*Including 0.35c for special quality

SEMI-FINISHED STEEL

Billets forging, Pitta. (NT) ..	\$84.50	\$84.50	\$84.50	\$84.50	\$66.00
Wire rods, 1/2"-5/8" Pitta. ...	5.375	5.375	5.375	5.025	4.10-4.30

PIG IRON, Gross Ton

Bessemer, Pitta.	\$62.25	\$62.25	\$61.00	\$59.50	\$53.00
Basic, Valley	60.00	60.00	60.00	58.50	52.00
Basic, deld. Phila.	66.26	66.26	63.76	62.16	56.49
No. 2 Fdry, NevilleIsland, Pa.	63.00	63.00	60.50	59.00	52.50
No. 2 Fdry, Chicago	60.50-63.00	60.50-63.00	60.50	59.00	52.50
No. 2 Fdry, deld. Phila. ...	66.76	66.76	64.26	62.66	56.99
No. 2 Fdry, Birm.	57.00	57.00	57.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	62.70	55.33
Malleable, Valley	60.50	60.50	60.50	59.00	52.50
Malleable, Chicago	60.50-63.00	60.50-63.00	60.50	59.00	52.50
Ferromanganese, Duquesne.	215.00†	215.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pittsburgh	\$55.50	\$46.50	\$44.50	\$43.00	\$45.00
No. 1 Heavy Melt, E. Pa. ...	54.00	50.00	47.00	44.50	43.50
No. 1 Heavy Melt, Chicago. ...	50.00	46.00	46.00	42.00	43.50
No. 1 Heavy Melt, Valley ...	59.50	49.50	44.50	46.50	45.00
No. 1 Heavy Melt, Cleve. ...	56.50	45.50	42.50	44.00	44.00
No. 1 Heavy Melt, Buffalo ...	44.50	44.50	42.50	39.50	44.00
Rails, Rerolling, Chicago ...	73.50	68.50	66.50	64.50	52.50
No. 1 Cast, Chicago	49.50	45.50	45.50	45.50	49.00

COKE, Net Ton

Beehive, Furn, Connlvi.	\$14.125	\$14.125	\$14.125	\$13.75	\$14.75
Beehive, Fdry, Connlvi.	16.50	16.50	16.50	16.75	17.50

Gardner-Denver . . . Serving the World's Basic Industries



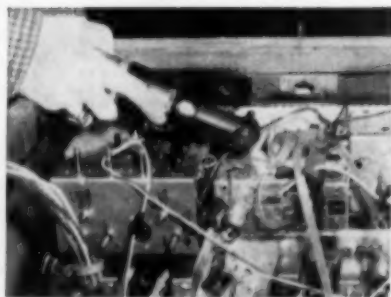
Operator fastens printed circuit assembly to color television chassis—with Keller Tool screw driver.

Keller air tools add the magic touch

Fastenings go into place zip . . . zip . . . zip—when operators use fast-acting Keller Tool screw drivers and nut setters. The pace keeps up throughout the shift—without undue fatigue.

Interchangeable Keller Tool attachments keep up promptly with production line changes. Positive or cushioned clutches. Straight or angle tips. Plus a wide variety of finders, bits and sockets—with magnetic, pneumatic or mechanical pickup and holding devices.

Bulletin 13 gives full information on Keller Tool pneumatic screw drivers and nut setters. Write us today.



Keller Tool right-angle nut setter speeds final assembly of the chassis in color TV cabinet.

GARDNER - DENVER

KELLER TOOL division, Grand Haven, Michigan

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY



Steel Prices

Mill prices as reported to BYTEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company. Key to producers, page 164; to footnotes, page 166

SEMIFINISHED

INGOTS, Carbon, Forging (NT)	
Munhall, Pa. U5	\$65.50
INGOTS, Alloy (NT)	
Detroit R7	\$69.00
Houston 85	\$74.00
Midland, Pa. C18	\$69.00
Munhall, Pa. U5	\$69.00

BILLETS, BLOOMS & SLABS

Carbon, Borelling (NT)	
Alquippa, Pa. J5	\$68.50
Bessemer, Pa. U5	\$83.50
Bridgeport, Conn. N19	\$73.50
Buffalo R2	\$85.50
Clairton, Pa. U5	\$85.50
Eneley, Ala. T2	\$85.50
Fairfield, Ala. T2	\$85.50
Fontana, Calif. K1	\$82.50
Gary, Ind. U5	\$85.50
Johnstown, Pa. B2	\$85.50
Lackawanna, N.Y. B2	\$85.50
LoneStar, Tex. L6	\$74.50
Munhall, Pa. U5	\$85.50
Pittsburgh J5	\$85.50
S. Chicago, Ill. R2, U5	\$85.50
S. Duquesne, Pa. U5	\$85.50
Youngstown R2	\$85.50

Carbon, Forging (NT)

Alquippa, Pa. J5	\$84.50
Bessemer, Pa. U5	\$84.50
Bridgeport, Conn. N19	\$89.50
Buffalo R2	\$84.50
Canton, O. R2	\$86.50
Clairton, Pa. U5	\$84.50
Conshohocken, Pa. A3	\$77.50
Eneley, Ala. T2	\$84.50
Fairfield, Ala. T2	\$84.50
Fontana, Calif. K1	\$100.50
Gary, Ind. U5	\$84.50
Geneva, Utah C11	\$84.50
Houston 85	\$101.00
Johnstown, Pa. B2	\$84.50
Lackawanna, N.Y. B2	\$84.50
Lackawanna B3	\$94.00
Midland, Pa. C18	\$84.50
Munhall, Pa. U5	\$84.50
Pittsburgh J5	\$84.50
Seattle B3	\$98.00
S. Chicago R2, U5	\$84.50
S. Chicago W14	\$89.50
S. Duquesne, Pa. U5	\$84.50
S. San Francisco B3	\$94.00

Alloy, Forging (NT)

Bethlehem, Pa. B2	\$96.00
Buffalo R2	\$96.00
Canton, O. R2, T7	\$96.00
Conshohocken, Pa. A3	\$111.00
Detroit R7	\$96.00
Fontana, Calif. K1	\$127.60
Gary, Ind. U5	\$96.00
Houston 85	\$108.00
Ind. Harbor, Ind. I-2	\$96.00
Johnstown, Pa. B2	\$96.00
Lackawanna, N.Y. B2	\$96.00
Los Angeles B3	\$116.00
Massillon, O. R2	\$96.00
Midland, Pa. C18	\$96.00
Munhall, Pa. U5	\$96.00
S. Chicago R2, U5	\$96.00
S. Chicago W14	\$101.00
S. Duquesne, Pa. U5	\$96.00
Struthers, O. Y1	\$96.00
Warren, O. C17	\$96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	\$103.50
Canton, O. R2	\$103.50
Cleveland R2	\$103.50
Gary, Ind. U5	\$103.50
S. Chicago R2	\$103.50
S. Chicago W14	\$108.50
S. Duquesne, Pa. U5	\$103.50
SKELP	
Alquippa, Pa. J5	\$4.225
LoneStar, Tex. L6	\$4.225
Munhall, Pa. U5	\$4.225
SparrowsPoint, Md. B2	\$4.225
Warren, O. R2	\$4.225
Youngstown R2, U5	\$4.225

WIRE RODS

Alabama City, Ala. R2	\$5.375
Alquippa, Pa. J5	\$5.375
Alton, Ill. L1	\$5.55
Buffalo W12	\$5.375
Cleveland A7	\$5.375
Donora, Pa. A1	\$5.375
Fairfield, Ala. T2	\$5.375
Houston 85	\$5.625
Indiana Harbor, Ind. Y1	\$5.375
Johnstown, Pa. B2	\$5.375
Joliet, Ill. A7	\$5.375
Kansas City, Mo. 85	\$5.625
Kokomo, Ind. C16	\$5.475

PLATES

Los Angeles B3	\$6.175
Minnequa, Colo. C10	\$5.625
Monaca, Pa. P7	\$5.375
N. Tonawanda, N.Y. B11	\$5.375
Pittsburgh Calif. C11	\$6.025
Portsmouth, O. P12	\$5.725
Roebling, N.J. R5	\$5.475
S. Chicago, Ill. R2	\$5.475
SparrowsPoint, Md. B2	\$5.475
Sterling, Ill. (1) N15	\$5.375
Sterling, Ill. N15	\$5.475
Struthers, O. Y1	\$5.375
Worcester, Mass. A7	\$5.675

STRUCTURALS

Carbon Steel Std. Shoppes	
Ala. City, Ala. R2	\$4.60
Alquippa, Pa. J5	\$4.60
Bessemer, Ala. T2	\$4.60
Bethlehem, Pa. B2	\$4.63
Birmingham C15	\$5.10
Clairton, Pa. U5	\$4.60
Fairfield, Ala. T2	\$4.60
Fontana, Calif. (30) K1	\$5.65
Gary, Ind. U5	\$4.60
Geneva, Utah C11	\$4.60
Granite City, Ill. G4	\$5.15
Harrisburg, Pa. P4	\$5.10
Houston 85	\$4.60
Ind. Harbor, Ind. I-2, Y1	\$4.50
Johnstown, Pa. B2	\$4.50
Lackawanna, N.Y. B2	\$4.50
LoneStar, Tex. L6	\$4.55
Manfield, O. E6	\$4.50
Minnequa, Colo. C10	\$5.35
Munhall, Pa. U5	\$4.50
Newport, Ky. N9	\$4.90
Pittsburgh J5	\$4.50
Riverdale, Ill. A1	\$4.90
Seattle B3	\$5.40
Sharon, Pa. 83	\$4.50
S. Chicago R2, U5	\$4.50
S. Chicago W14	\$4.75
SparrowsPoint, Md. B2	\$4.50
Steubenville, O. W10	\$4.50
Warren, O. R2	\$4.50
Weirton, W. Va. W6	\$4.50
Youngstown R2, U5, Y1	\$4.50

Wide Flange

Bethlehem, Pa. B2	\$4.65
Clairton, Pa. U5	\$4.60
Fontana, Calif. K1	\$5.90
Lackawanna, N.Y. B2	\$4.65
Munhall, Pa. U5	\$4.60
Phoenixville, Pa. P4	\$5.15
S. Chicago, Ill. U5	\$4.60

N.S., L.A. Std. Shoppes

Alquippa, Pa. J5	\$5.75
Bessemer, Ala. T2	\$5.75
Bethlehem, Pa. B2	\$5.80
Clairton, Pa. U5	\$5.75
Fairfield, Ala. T2	\$5.75
Fontana, Calif. K1	\$7.90
Gary, Ind. U5	\$5.75
Geneva, Utah C11	\$5.75
Houston 85	\$6.85
Houston 85	\$6.85
Ind. Harbor, Ind. I-2, Y1	\$6.75
Johnstown, Pa. B2	\$6.80
Kansas City, Mo. 85	\$6.85
Lackawanna, N.Y. B2	\$6.80
Los Angeles B3	\$7.45
Munhall, Pa. U5	\$5.75
Seattle B3	\$7.50
S. Chicago, Ill. U5	\$5.75
S. Chicago W14	\$7.00
S. San Francisco B3	\$7.40
Struthers, O. Y1	\$5.75

N.S., L.A. Wide Flange

Bethlehem, Pa. B2	\$6.80
Lackawanna, N.Y. B2	\$6.80
Munhall, Pa. U5	\$6.75
S. Chicago, Ill. U5	\$6.75

PILING

BEARING FILES	
Bethlehem, Pa. B2	\$4.65
Lackawanna, N.Y. B2	\$4.65
Munhall, Pa. U5	\$4.60
S. Chicago, Ill. U5	\$4.60
STEEL SHEET PILING	
Ind. Harbor, Ind. I-2	\$5.45
Lackawanna, N.Y. B2	\$5.45
Munhall, Pa. U5	\$5.45
S. Chicago, Ill. U5	\$5.45

PLATES

PLATES, Carbon Steel	
Ala. City, Ala. R2	\$4.50
Alquippa, Pa. J5	\$4.50
Alton, Ill. L1	\$4.50
Bessemer, Ala. T2	\$4.50
Bridgeport, Conn. N19	\$4.50
Buffalo R2	\$4.50
Clairton, Pa. U5	\$4.50
Claymont, Del. C22	\$5.35
Cleveland J5, R2	\$4.60
Coteseville, Pa. L7	\$4.80
Conshohocken, Pa. A3	\$4.95
Detroit M1	\$4.60
Ecorse, Mich. G5	\$4.60
Fairfield, Ala. T2	\$4.50
Fontana, Calif. (30) K1	\$5.65
Gary, Ind. U5	\$4.50
Geneva, Utah C11	\$4.50
Granite City, Ill. G4	\$5.15
Harrisburg, Pa. P4	\$5.10
Houston 85	\$4.60
Ind. Harbor, Ind. I-2, Y1	\$4.50
Johnstown, Pa. B2	\$4.50
Lackawanna, N.Y. B2	\$4.50
LoneStar, Tex. L6	\$4.55
Manfield, O. E6	\$4.50
Minnequa, Colo. C10	\$5.35
Munhall, Pa. U5	\$4.50
Newport, Ky. N9	\$4.90
Pittsburgh J5	\$4.50
Riverdale, Ill. A1	\$4.90
Seattle B3	\$5.40
Sharon, Pa. 83	\$4.50
S. Chicago R2, U5	\$4.50
S. Chicago W14	\$4.75
SparrowsPoint, Md. B2	\$4.50
Steubenville, O. W10	\$4.50
Warren, O. R2	\$4.50
Weirton, W. Va. W6	\$4.50
Youngstown R2, U5, Y1	\$4.50

PLATES, Carbon Alloys Resist.

Claymont, Del. C22	\$6.20
Fontana, Calif. K1	\$6.80
Geneva, Utah C11	\$5.65
Johnstown, Pa. B2	\$5.65
SparrowsPoint, Md. B2	\$5.65

PLATES, Wrought Iron

Economy, Pa. B14	\$11.128
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PLATES, High-Strength Low-Alloy

Alquippa, Pa. J5	\$6.725
Bessemer, Ala. T2	\$6.725
Clairton, Pa. U5	\$6.725
Cleveland J5, R2	\$6.725
Claymont, Del. C22	\$6.725
Coteseville, Pa. L7	\$6.725
Conshohocken, Pa. A3	\$7.175
Ecorse, Mich. G5	\$6.825
Fairfield, Ala. T2	\$6.725
Fontana, Calif. (30) K1	\$7.875
Gary, Ind. U5	\$6.725
Geneva, Utah C11	\$6.725
Houston 85	\$6.825
Ind. Harbor, Ind. I-2, Y1	\$6.725
Johnstown, Pa. B2	\$6.725
Lackawanna, N.Y. B2	\$6.725
Los Angeles B3	\$6.925
Massillon, O. R2	\$6.725
Midland, Pa. C18	\$6.725
S. Chicago R2, U5	\$6.725
S. Chicago W14	\$6.825
S. Duquesne, Pa. U5	\$6.725
Struthers, O. Y1	\$6.575
Warren, O. C17	\$6.975
Youngstown U5	\$6.575

PLATES, Alloy

Bridgeport, Conn. N19	\$6.55
Claymont, Del. C22	\$6.30
Coteseville, Pa. L7	\$6.30
Fontana, Calif. (30) K1	\$7.70
Gary, Ind. U5	\$6.30
Houston 85	\$6.40
Ind. Harbor, Ind. Y1	\$6.30
Johnstown, Pa. B2	\$6.30
Munhall, Pa. U5	\$6.30
Newport, Ky. N9	\$7.00
Seattle B3	\$7.20
Sharon, Pa. 83	\$6.30
S. Chicago, Ill. U5	\$6.30
S. Chicago W14	\$6.55
SparrowsPoint, Md. B2	\$6.30
Youngstown Y1	\$6.30

FLOOR PLATES

Cleveland J5	\$5.75
Conshohocken, Pa. A3	\$6.025
Harrisburg, Pa. P4	\$5.75
Ind. Harbor, Ind. I-2	\$5.75
Munhall, Pa. U5	\$5.75
S. Chicago, Ill. U5	\$5.75
PLATES, Ingot Iron	
Ashland c.l. (15) A10	\$4.75
Ashland l.c.l. (15) A10	\$5.25
Cleveland c.l. R2	\$5.10
Warren, O. c.l. R2	\$5.10

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)	
Ala. City, Ala. (9) R2	\$4.65
Alquippa, Pa. (9) J5	\$4.65
Alton, Ill. L1	\$4.85
Atlanta (9) A11	\$5.15
Bessemer, Ala. (9) T2	\$4.65
Birmingham C15	\$5.15
Bridgeport, Conn. N19	\$4.80
Buffalo (9) R2	\$4.65
Canton, O. (9) R2	\$4.75
Clairton, Pa. (9) U5	\$4.65
Cleveland (9) R2	\$4.65
Ecorse, Mich. (9) G5	\$4.75
Emeryville, Calif. J7	\$5.40
Fairfield, Ala. (9) T2	\$4.65
Fairless, Pa. (9) U5	\$4.80
Fontana, Calif. (9) K1	\$5.80
Gary, Ind. (9) U5	\$4.65
Houston (9) 85	\$4.90
Ind. Harbor, Ind. (9) I-2, A5	\$4.65
Ind. Harbor, Ind. Y1	\$4.65
Johnstown, Pa. (9) B2	\$4.65
Joliet, Ill. P22	\$5.15
Kansas City, Mo. (9) 85	\$4.90
Lackawanna (9) B2	\$4.65
Los Angeles (9) B3	\$5.35
Massillon, O. (9) R2	\$4.75
Midland, Pa. (9) C18	\$4.65
Milton, Pa. M18	\$5.25
Minnequa, Colo. C10	\$5.10
Niles, Calif. P1	\$5.85
N. Tonawanda, N.Y. (9) B11	\$4.65
Pittsburgh Calif. (9) C11	\$5.35
Pittsburgh (9) J5	\$4.65
Portland, Ore. O4	\$4.40
Seattle B3, N14	\$5.40
S. Chicago W14	\$4.90
S. Chicago, Ill. (9) R2, U5	\$4.65
S. Duquesne, Pa. (9) U5	\$4.65
S. San Fran., Calif. (9) B3	\$5.40
Sterling, Ill. (1) N15	\$4.65
Steubenville, O. W10	\$4.75
Struthers, O. Y1	\$4.65
Torrance, Calif. (9) C11	\$5.35
Warren, O. (9) R2	\$4.65
Weirton, W. Va. (9) W6	\$4.65
Youngstown (9) R2, U5	\$4.65

BARS, H.R. Lead Alloy

Warren, O. C17	\$7.075
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BARS, Hot-Rolled Alloy

Bethlehem, Pa. B2	\$5.575
Bridgeport, Conn. N19	\$5.725
Buffalo R2	\$5.575
Canton, O. R2, T7	\$5.575
Clairton, Pa. U5	\$5.575
Detroit R7	\$5.575
Ecorse, Mich. G5	\$5.675
Fairless, Pa. U5	\$5.725
Fontana, Calif. K1	\$7.175
Gary, Ind. U5	\$5.575
Houston 85	\$6.825
Ind. Harbor, Ind. I-2, Y1	\$5.575
Johnstown, Pa. B2	\$5.575
Lackawanna, N.Y. B2	\$5.575
Los Angeles B3	\$6.925
Massillon, O. R2	\$5.575
Midland, Pa. C18	\$5.575
S. Chicago R2, U5	\$5.575
S. Chicago W14	\$5.825
S. Duquesne, Pa. U5	\$5.575
Struthers, O. Y1	\$5.575
Warren, O. C17	\$6.975
Youngstown U5	\$5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Alquippa, Pa. J5	\$6.80
Bessemer, Ala. T2	\$6.80
Bethlehem, Pa. B2	\$6.80
Clairton, Pa. U5	\$6.80
Cleveland R2	\$6.80
Ecorse, Mich. G5	\$6.90
Fairfield, Ala. T2	\$6.80
Fontana, Calif. K1	\$7.95
Gary, Ind. U5	\$6.80
Houston 85	\$7.05
Ind. Harbor, Ind. I-2, Y1	\$6.80
Johnstown, Pa. B2	\$6.80
Kansas City, Mo. 85	\$7.05
Lackawanna, N.Y. B2	\$6.80
Los Angeles B3	\$7.05
Pittsburgh J5	\$6.80
Seattle B3	\$7.55
S. Chicago W14	\$7.05
S. Duquesne, Pa. U5	\$6.80
S. San Francisco B3	\$7.55
Struthers, O. Y1	\$6.80
Warren, O. R2	\$6.80
Youngstown U5	\$6.80
BAR SIZE ANGLES, H.R. Carbon	
Bethlehem, Pa. (9) B2	\$4.80
Lackawanna (9) B2	\$4.65
Fairless, Pa. (9) U5	\$4.80
Fontana, Calif. K1	\$5.80
Pt. Wadsworth, Tex. (42) T4	\$5.10
Gary, Ind. U5	\$4.65
Houston 85	\$4.90

Joliet, Ill. P22	\$5.10
Niles, Calif. P1	\$5.85
Pittsburgh J5	\$4.65

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2	4.325
Allenport, Pa. P7	4.325
Alton, Ill. L1	4.50
Ashland, Ky. (8) A10	4.325
Atlanta A11	4.325
Bessemer, Ala. T2	4.325
Birmingham C15	4.825
Bridgeport, Conn. N19	4.625
Buffalo (27) R2	4.325
Conahocken, Pa. A3	4.775
Detroit M1	4.425
Ecorse, Mich. G5	4.425
Fairfield, Ala. T2	4.325
Fontana, Calif. K1	5.575
Gary, Ind. U5	4.325
Ind. Harbor, Ind. I-2, Y1	4.325
Johnstown, Pa. (25) B2, 4.325	
Lackawanna, N.Y. (24) B2	4.325
Los Angeles (25) B3	5.075
Minnequa, Colo. C10	5.425
Pittsburg, Calif. C11	5.075
Riverdale, Ill. A1	4.725
San Francisco B7	5.95
Seattle (25) B3	5.325
Sharon, Pa. B3	4.325
S. Chicago, Ill. W14	4.575
S. San Francisco (25) B3	5.075
SparrowsPoint, Md. B2	4.325
Sterling, Ill. (1) N15	4.325
Sterling, Ill. N15	4.425
Torrance, Calif. C11	5.075
Warren, O. R2	4.325
Weirton, W. Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport, Conn. N19	7.50
Carnegie, Pa. S18	7.20
Fontana, Calif. K1	9.65
Gary, Ind. U5	7.20
Ind. Harbor, Ind. Y1	7.20
Los Angeles B3	8.40
Newport Ky. N9	7.90
Sharon, Pa. B3	7.40
S. Chicago W14	7.45
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer, Ala. T2	6.425
Conahocken, Pa. A3	6.825
Ecorse, Mich. G5	6.525
Fairfield, Ala. T2	6.425
Fontana, Calif. K1	8.925
Gary, Ind. U5	6.425
Houston, Pa. B3	6.875
Ind. Harbor, Ind. I-2, Y1	6.425
Kansas City, Mo. B5	6.675
Lackawanna, N.Y. B2	6.425
Los Angeles (25) B3	7.175
Seattle (25) B3	7.425
Sharon, Pa. B3	6.425
S. San Francisco (25) B3	7.175
SparrowsPoint, Md. B2	6.425
Warren, O. R2	6.425
Weirton, W. Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	5.775
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STRIP, Cold-Rolled Carbon

Anderson, Ind. G6	6.85
Baltimore T6	6.25
Boston T6	6.80
Buffalo B40	6.25
Cleveland A7, J5	6.25
Conahocken, Pa. A3	6.70
Dearborn, Mich. D3	6.35
Detroit M1, P20	6.35
Detroit D2	6.95
Dover, O. G6	6.85
Ecorse, Mich. G5	6.35
Fontana, Calif. K1	8.70
Franklin Park, Ill. T6	6.35
Ind. Harbor, Ind. I-2	6.35
Ind. Harbor, Ind. Y1	6.25
Indianapolis C8	6.40
Lackawanna, N.Y. B2	6.25
Los Angeles C1	8.90
New Bedford, Mass. R10	6.70
New Britain (10) S15	6.25
New Castle, Pa. B4, E5	6.25
New Haven, Conn. A7	6.70
New Haven, Conn. D2	7.30
New Kensington, Pa. A6	6.25
Pawtucket, R.I. R3	6.90
Pawtucket, R.I. N8	6.80
Pittsburgh J5	6.25
Riverdale, Ill. A1	6.95
Roma, N.Y. (32) R6	6.25
Sharon, Pa. B3	6.25

SparrowsPt., Md. B2	6.25
Trenton, N.J. (31) R5	6.70
Wallingford, Conn. W2	6.80
Warren, O. R2, T5	6.25
Weirton, W. Va. W6	6.25
Worcester, Mass. A7	6.80
Youngstown C8, Y1	6.25

STRIP, Cold-Rolled Alloy

Boston T6	11.80
Carnegie, Pa. S18	11.45
Cleveland A7	11.45
Dover, O. G6	11.45
Franklin Park, Ill. T6	11.45
Harrison, N.J. C18	11.45
Indianapolis C8	11.60
Pawtucket, R.I. N8	11.80
Sharon, Pa. B3	11.45
Worcester, Mass. A7	11.75
Youngstown C8	11.45

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	9.10
Dearborn, Mich. D3	9.20
Dover, O. G6	9.30
Ecorse, Mich. G5	9.20

STRIP, Cold-Finished Spring Steel (Annealed)

Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol, Conn. W1			10.90	13.05	15.75
Carnegie, Pa. S18		9.05	10.60	12.75	15.45
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7		9.05	10.60	12.75	15.45
Dearborn, Mich. D3	7.20	9.15	10.70		
Detroit D2	7.20	9.15	10.70	12.85	
Dover, O. G6	7.10	9.05	10.60	12.75	15.45
Franklin Park, Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison, N.J. C18		9.90	13.05	15.75	
Indianapolis C8	7.25	9.20	10.80	12.75	15.45
New Britain, Conn. (10) S15	7.10	9.05	10.60	12.75	15.45
New Castle, Pa. B4, E5		7.10	9.05	10.60	12.75
New Haven, Conn. D2	7.55	9.35	10.90	13.05	15.75
New Kensington, Pa. A6	7.10	9.05	10.60		
New York W3		9.35	10.90	13.05	15.75
Pawtucket, R.I. N8	7.05	9.35	10.90	13.05	15.75
Riverdale, Ill. A1	7.20	9.05	10.60	12.75	15.45
Roma, N.Y. (32) R6	7.10	9.05	10.60	12.75	15.45
Sharon, Pa. B3	7.10	9.05	10.60	12.75	15.45
Trenton, N.J. R5		9.35	10.90	13.05	15.75
Wallingford, Conn. W2	7.05	9.35	10.90	13.05	15.75
Warren, O. T5	7.10	9.05	10.60	12.75	15.45
Weirton, W. Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester, Mass. A7, T6	7.05	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45

Spring Steel (Tempered)

Bristol Conn. W1	14.80	18.15
Buffalo W12	14.80	
Franklin Park, Ill. T6	15.15	18.50
Harrison, N.J. C18	14.80	18.15
New York W3	14.80	18.15
Trenton, N.J. R5	14.80	18.15
Worcester, Mass. W13	14.80	18.15
Worcester, Mass. A7, T6	14.80	18.15
Youngstown C8	15.15	18.50

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Arma-	Elec-	Motor	Dynamo
BeechBottom, W. Va. W10		9.95	10.95	11.85	
Brackenside, Pa. A4		9.95	10.95	11.85	
Mansfield, O. E6	8.40	9.35	9.95	10.95	11.85
Newport, Ky. N9	9.00	9.95	10.55	11.55	12.45
Niles, O. M21	8.40	9.35	9.95	10.95	11.85
Vandergriff, Pa. U5		9.35	9.95	10.95	11.85
Warren, O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville, O. A10		9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed 1/2 lower)

Field	Arma-	Elec-	Motor	Dynamo
Brackenside, Pa. A4	10.70	11.70	12.60	
Granite City, Ill. G4	9.30*	10.30*	10.90*	11.90*
Indiana Harbor, Ind. I-2	8.60*	9.60*	10.20*	11.20*
Vandergriff, Pa. U5	8.60*	9.60*	10.20*	11.20*
Vandergriff, Pa. U5	10.10*	10.70*	11.70*	12.60*
Warren, O. R2	8.60*	10.10	10.70	11.70

H.R. SHEETS (22 Ga., cut lengths)

T-73	T-65	T-58	T-52	
BeechBottom, W. Va. W10	12.80	13.35	13.85	14.85
Brackenside, Pa. A4	12.80	13.35	13.85	14.85
Vandergriff, Pa. U5	12.80	13.35	13.85	14.85
Zanesville, O. A10	12.80*	13.35*	13.85*	14.85*

C.R. COILS & CUT LENGTHS (22 Ga.) Grain Oriented

T-100	T-90	T-80	T-73	T-66	T-72
Brackenside, Pa. A4	15.85	17.45	17.95	18.45	13.50**
Butler, Pa. A10		17.45	17.95		
Vandergriff, Pa. U5	14.55	15.85	17.45	17.95	13.55**
Warren, O. R2					13.55*

*Semiprocessed. *Fully processed. *1Coils, annealed, semiprocessed 1/2 lower. **Coils, %-cent higher. **Cut lengths, %-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Base)	0.25 lb	0.50 lb	0.75 lb
Altoona, Pa. J5	\$8.30	\$8.55	\$8.95
Dravosburg, Pa. U5	8.30	8.55	8.95
Fairfield, Ala. T2	8.40	8.65	9.05
Fairless, Pa. U5	8.40	8.65	9.05
Fontana, Calif. K1	9.05	9.30	9.70
Gary, Ind. U5	8.30	8.55	8.95
Granite City, Ill. G4	8.40	8.65	9.05
Indiana Harbor, Ind. I-2, Y1	8.30	8.55	8.95
Niles, O. R2	8.30	8.55	8.95
Pittsburg, Calif. C11	9.05	9.30	9.70
SparrowsPoint, Md. B2	8.40	8.65	9.05
Weirton, W. Va. W6	8.30	8.55	8.95
Yorkville, O. W10	8.30	8.55	8.95

ELECTROTI (22-27 Gage; Dollars per 100 lb)			
Altoona, Pa. J5	9.75		
Niles, O. R2	9.75	7.15	7.375

TINPLATE, American 1.25 1.50	lb	lb	lb
Altoona, Pa. J5 \$9.60	\$9.85		
Dravosburg, Pa. U5 9.60	9.85		
Fairfield, Ala. T2 9.70	9.95		
Fairless, Pa. U5 9.70	9.95		
Fontana, Calif. K1 10.35	10.65		
Gary, Ind. U5 9.60	9.85		
Ind. Har. I-2, Y1 9.60	9.85		
Pitts. Calif. C11 10.35	10.65		
Sp Pt. Md. B2 9.70	9.95		
Weirton, W. Va. W6 9.60	9.85		
Yorkville, O. W10 9.60	9.85		

Altoona, Pa. J5 \$9.60	\$9.85		
Dravosburg, Pa. U5 9.60	9.85		
Fairfield, Ala. T2 9.70	9.95		
Fairless, Pa. U5 9.70	9.95		
Fontana, Calif. K1 10.35	10.65		
Gary, Ind. U5 9.60	9.85		
Ind. Har. I-2, Y1 9.60	9.85		
Pitts. Calif. C11 10.35	10.65		
Sp Pt. Md. B2 9.70	9.95		
Weirton, W. Va. W6 9.60	9.85		
Yorkville, O. W10 9.60	9.85		

HOLLOWWARE SHAMELING (Black Plate (29 Gage))

Dravosburg, Pa. U5	6.65
Gary, Ind. U5	6.65
Granite City, Ill. G4	7.25
Ind. Harbor, Ind. Y1	6.65
Yorkville, O. W10	6.65

MANUFACTURING TERMS (Special Coated; Base Box)

Dravosburg, Pa. U5	\$9.10
Gary, Ind. U5	\$9.10
Yorkville, O. W10	\$9.10

MANUFACTURING TERMS (Light Coated; 6 lb; Base Box)

Yorkville, O. W10	\$9.55
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ROOFING SHORT TERMS (8 lb Coated; Base Box)

Gary, Ind. U5	\$10.65
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WIRE

WIRE, Manufacturers Bright, Low Carbon

Alabama City, Ala. R2	6.60
Altoona, Pa. J5	6.60
Alton, Ill. L1	6.775
Atlanta A11	6.80
Bartonville, Ill. K4	6.70
Buffalo W12	6.60
Chicago W13	6.60
Cleveland A7, C20	6.60
Crawfordsville, Ind. M8	6.70
Donora, Pa. A7	6.60
Duluth, Minn. A7	6.60
Fairfield, Ala. T2	6.60
Fostoria, O. (24) R1	6.60
Houston R5	6.65
Jacksonville, Fla. M8	6.95
Johnstown, Pa. B2	6.60
Joliet, Ill. A7	6.60
Kansas City, Mo. B5	6.85
Kokomo, Ind. C10	7.20
Los Angeles B3	7.65
Minnequa, Colo. C10	6.85
Moneess, Pa. P7	6.60
Newark 6-6 Gs. I-1	6.90
N. Tonawanda B11	6.60
Palmer, Mass. W12	6.90
Pittsburg, Calif. C11	7.55
Portsmouth, O. P12	7.10
Rankin, Pa. A7	6.60
S. Chicago, Ill. R2	6.60
S. San Francisco C11	7.55
SparrowsPoint, Md. B2	6.70
Sterling, Ill. (1) N15	6.60
Sterling, Ill. N15	6.70
Struthers, O. Y1	6.60
Waukegan, Ill. A7	6.60
Worcester, Mass. A7	6.90

WIRE, MS Spring, High Carbon

Altoona, Pa. J5	9.70
Bartonville, Ill. K4	8.00
Buffalo W12	7.90
Johnstown, Pa. B2	7.90
Minnequa, Colo. C10	8.25
Moneess, Pa. P7	8.10
Palmer, Mass. W12	7.90
Duluth, Minn. A7	7.90
Fostoria, O. B1	7.95
Johnstown, Pa. B2	7.90
Los Angeles B3	8.5
Milbury, Mass. (12) N6	8.20
Minnequa, Colo. C10	8.15
Moneess, Pa. P7, P16	7.90
Muncie, Ind. I-7	8.10
Palmer, Mass. W12	8.20
Pittsburg, Calif. C11	8.85
Portsmouth, O. P12	8.60
Roebing N.J. R5	8.20
S. Chicago, Ill. R2	7.90
S. San Francisco C10	8.85
SparrowsPt. Md. B2	8.60
Struthers, O. Y1	7.90
Trenton, N.J. A7	8.20
Waukegan, Ill. A7	7.90
Worcester A7, J4, T6, W12	8.20

WIRE, Upholstery Spring

WIRE

(Continued)

WIRE, Tine Band

Bartonsville, Ill. K4	14.15
Monaca, Pa. P16	14.20
Rosbling, N. J. J5	14.30

WIRE, Cold-Rolled Flat

Anderson, Ind. G6	10.25
Baltimore T8	9.80
Boston T8	9.80
Buffalo W12	9.80
Cleveland A7	9.80
Crawfordsville, Ind. M8	9.80
Dover, O. G6	10.25
Fostoria, O. S1	9.80
Franklin Park, Ill. T6	9.60
Kokomo, Ind. C16	9.80
Massillon, O. R8	9.80
Milwaukee C23	9.70
Monaca, Pa. P7, P16	9.80
Pawtucket, R.I. W8	9.80
Riversdale, Ill. A1	9.60
Roma, N.Y. H6	9.50
Trenton, N.J. R6	9.80
Worcester A7, T8, W12	9.80

Call No. 6500 Interim

Alabama City, Ala. R2	9.80
Bartonsville, Ill. K4	9.80
Buffalo, W12	9.80
Crawfordsville, Ind. M8	9.80
Donora, Pa. A7	9.80
Duluth, Minn. A7	9.80
Jacksonville, Fla. M8	10.36
Johnstown, Pa. B2	9.80
Joliet, Ill. A7	9.80
Kokomo, Ind. C16	9.80
Los Angeles R3	10.60
Minnequa, Colo. C10	10.00
Pittsburg, Calif. C11	10.60
S. Chicago, Ill. R2	9.80
Sparrows Pt., Md. B2	9.80
Sterling, Ill. N15	9.70

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

MAIL, Stock

To Dealers & Mfrs. (7) Col.

Alabama City, Ala. R2	182
Alquippa, Pa. J5	182
Atlanta A11	184
Bartonsville, Ill. K4	184
Chicago, Ill. W12	182
Cleveland A9	187
Crawfordsville, Ind. M8	184
Donora, Pa. A7	182
Duluth, Minn. A7	182
Fairfield, Ala. T2	182
Houston, Tex. B2	187
Jackville, Fla. (20) M8	183
Johnstown, Pa. B2	182
Joliet, Ill. A7	182
Kansas City, Mo. B5	182
Kokomo, Ind. C16	180
Minnequa, Colo. C10	187
Monaca, Pa. P7	182
Pittsburg, Calif. C11	171
Rankin, Pa. A7	182
S. Chicago, Ill. R2	182
Sparrows Pt., Md. B2	184
Sterling, Ill. (1) N15	182
Worcester, Mass. A7	184

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	175*
Alquippa, Pa. J5	172*
Atlanta A11	181
Bartonsville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175*
Duluth, Minn. A7	175*
Fairfield, Ala. T2	175*
Houston, Tex. B2	180*
Jacksonville, Fla. M8	186
Joliet, Ill. A7	179
Kansas City, Mo. B5	180*
Kokomo, Ind. C16	183*
Minnequa, Colo. C10	180*
Monaca, Pa. P7	178*
Pittsburg, Calif. C11	195*
Rankin, Pa. A7	175*
S. Chicago, Ill. R2	175*
S. San Francisco, Cal. C10	195*
Sparrows Pt., Md. B2	181*
Sterling, Ill. (1) N15	179*

WIRE, Barbed Col.

Alabama City, Ala. R2	99.45
Bartonsville, Ill. K4	9.45
Buffalo W12	9.45
Crawfordsville, Ind. M8	9.85
Donora, Pa. A7	9.45
Duluth, Minn. A7	9.45
Jacksonville, Fla. M8	10.01
Johnstown, Pa. B2	9.45
Joliet, Ill. A7	9.45
Kokomo, Ind. C16	9.85
Los Angeles R3	10.34
Minnequa, Colo. C10	9.70
Pittsburg, Calif. C11	10.23
S. Chicago, Ill. R2	9.45
Sparrows Pt., Md. B2	9.85
Sterling, Ill. N15	9.35

Call No. 6500 Stand.

Alabama City, Ala. R2	99.75
Bartonsville, Ill. K4	9.75
Buffalo W12	9.75
Crawfordsville, Ind. M8	9.85
Donora, Pa. A7	9.75
Duluth, Minn. A7	9.75
Jacksonville, Fla. M8	10.31
Johnstown, Pa. B2	9.75
Joliet, Ill. A7	9.75
Kokomo, Ind. C16	9.85
Los Angeles R3	10.33
Minnequa, Colo. C10	10.00
Pittsburg, Calif. C11	10.65
S. Chicago, Ill. R2	9.75
Sparrows Pt., Md. B2	9.85
Sterling, Ill. N15	9.65

WIRE, Merchant Quality

Alabama City, Ala. R2	7.50
Alquippa, Pa. J5	7.40
Atlanta A11	7.50
Bartonsville, Ill. K4	7.40
Buffalo W12	7.50
Cleveland A7	7.50
Crawfordsville, Ind. M8	7.40
Donora, Pa. A7	7.50
Duluth, Minn. A7	7.50
Fairfield, Ala. T2	7.50
Houston, Tex. B2	7.50
Jackville, Fla. (20) M8	7.45
Johnstown, Pa. B2	7.50
Joliet, Ill. A7	7.50
Kansas City, Mo. B5	7.45
Kokomo, Ind. C16	7.50
Los Angeles R3	7.85
Minnequa, Colo. C10	7.45
Monaca, Pa. P7	7.45
Pittsburg, Calif. C11	7.45
Rankin, Pa. A7	7.50
S. Chicago, Ill. R2	7.45
S. San Francisco, Cal. C10	7.50
Sparrows Pt., Md. B2	7.45
Sterling, Ill. (1) N15	7.45
Worcester, Mass. A7	7.50

WIRE, Merchant Quality

Alabama City, Ala. R2	7.50
Alquippa, Pa. J5	7.40
Atlanta A11	7.50
Bartonsville, Ill. K4	7.40
Buffalo W12	7.50
Cleveland A7	7.50
Crawfordsville, Ind. M8	7.40
Donora, Pa. A7	7.50
Duluth, Minn. A7	7.50
Fairfield, Ala. T2	7.50
Houston, Tex. B2	7.50
Jackville, Fla. (20) M8	7.45
Johnstown, Pa. B2	7.50
Joliet, Ill. A7	7.50
Kansas City, Mo. B5	7.45
Kokomo, Ind. C16	7.50
Los Angeles R3	7.85
Minnequa, Colo. C10	7.45
Monaca, Pa. P7	7.45
Pittsburg, Calif. C11	7.45
Rankin, Pa. A7	7.50
S. Chicago, Ill. R2	7.45
S. San Francisco, Cal. C10	7.50
Sparrows Pt., Md. B2	7.45
Sterling, Ill. (1) N15	7.45
Worcester, Mass. A7	7.50

WIRE, Merchant Quality

Alabama City, Ala. R2	7.50
Alquippa, Pa. J5	7.40
Atlanta A11	7.50
Bartonsville, Ill. K4	7.40
Buffalo W12	7.50
Cleveland A7	7.50
Crawfordsville, Ind. M8	7.40
Donora, Pa. A7	7.50
Duluth, Minn. A7	7.50
Fairfield, Ala. T2	7.50
Houston, Tex. B2	7.50
Jackville, Fla. (20) M8	7.45
Johnstown, Pa. B2	7.50
Joliet, Ill. A7	7.50
Kansas City, Mo. B5	7.45
Kokomo, Ind. C16	7.50
Los Angeles R3	7.85
Minnequa, Colo. C10	7.45
Monaca, Pa. P7	7.45
Pittsburg, Calif. C11	7.45
Rankin, Pa. A7	7.50
S. Chicago, Ill. R2	7.45
S. San Francisco, Cal. C10	7.50
Sparrows Pt., Md. B2	7.45
Sterling, Ill. (1) N15	7.45
Worcester, Mass. A7	7.50

WIRE, Merchant Quality

Alabama City, Ala. R2	7.50
Alquippa, Pa. J5	7.40
Atlanta A11	7.50
Bartonsville, Ill. K4	7.40
Buffalo W12	7.50
Cleveland A7	7.50

SEAMLESS STANDARD PIPE, Threaded and Coupled

Size-Inches	2	2 1/2	3	3 1/2	4	5	6
List Per Ft	37c	58.5c	76.5c	92c	\$1.09	\$1.48	\$1.92
Pounds Per Ft	3.68	5.82	7.62	9.20	10.89	14.81	19.18
	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*
Alliquippa, Pa. J5	4 +14	10.5 +8.25	13 +5.75	14.5 +4.25	14.5 +4.25	14 +4.75	16.5 +2.25
Ambridge, Pa. N2	4	10.5	13	14.5	14.5	14	16.5
Lorain, O. N3	4 +14	10.5 +8.25	13 +5.75	14.5 +4.25	14.5 +4.25	14 +4.75	16.5 +2.25
Youngstown Y1	6.5 +11.5	10.5 +8.25	13 +5.75	14.5 +4.25	14.5 +4.25	14 +4.75	16.5 +2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Youngstown R2	6.5 +11.5	10.5 +8.25	13 +5.75	14.5 +4.25	14.5 +4.25	14 +4.75	16.5 +2.25
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BUTTWELD STANDARD PIPE, Threaded and Coupled

Size-Inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
List Per Ft	5.5c	6c	6c	8.5c	11.5c	17c	1 1/4	1 1/2	1 1/2	1 1/2
Pounds Per Ft	0.24	0.42	0.57	0.85	1.13	1.68	2.28	3.13	4.13	5.28
	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*
Alliquippa, Pa. J5	27	27.5	27.5	29	29	29	29	29	29	29
Alton, Ill. L1	25	25.5	25.5	27	27	27	27	27	27	27
Benwood, W. Va. W10	27	27.5	27.5	29	29	29	29	29	29	29
Etna, Pa. N2	27	27.5	27.5	29	29	29	29	29	29	29
Fairless, Pa. N3	25	25.5	25.5	27	27	27	27	27	27	27
Fontana, Calif. K1	14.5 +3	15 +2.5	15 +2.5	16.5 +1.75	16.5 +1.75	16.5 +1.75	16.5 +1.75	16.5 +1.75	16.5 +1.75	16.5 +1.75
Ind. Harbor, Ind. Y1	26	26.5	26.5	28	28	28	28	28	28	28
Lorain, O. N3	27	27.5	27.5	29	29	29	29	29	29	29
Sharon, Pa. M6	27	27.5	27.5	29	29	29	29	29	29	29
Sparrows Pt., Md. B2	25	25.5	25.5	27	27	27	27	27	27	27
Wheatland, Pa. W9	27	27.5	27.5	29	29	29	29	29	29	29
Youngstown R2, Y1	27	27.5	27.5	29	29	29	29	29	29	29

Size-Inches	1 1/2	2	2 1/2	3	3 1/2	4
List Per Ft	27.5c	37c	58.5c	76.5c	92c	\$1.09
Pounds Per Ft	2.73	3.68	5.82	7.62	9.20	10.89
	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*	Bk Galv*
Alliquippa, Pa. J5	27	27.5	29	29	29	29
Alton, Ill. L1	25	25.5	27	27	27	27
Benwood, W. Va. W10	27	27.5	29	29	29	29
Etna, Pa. N2	27	27.5	29	29	29	29
Fairless, Pa. N3	25	25.5	27	27	27	27
Fontana, Calif. K1	14.5 +3	15 +2.5	15 +2.5	16.5 +1.75	16.5 +1.75	16.5 +1.75
Ind. Harbor, Ind. Y1	26	26.5	28	28	28	28
Lorain, O. N3	27	27.5	29	29	29	29
Sharon, Pa. M6	27	27.5	29	29	29	29
Sparrows Pt., Md. B2	25	25.5	27	27	27	27
Wheatland, Pa. W9	27	27.5	29	29	29	29
Youngstown R2, Y1	27	27.5	29	29	29	29

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rolling—	Forging	Seamless Tube	H.R. Strip	Wire Rods	Straight Rods	Strips	Sheets	C.R. Strip
201	18.50	23.00	31.00	31.00	31.00	31.00	31.00	31.00	31.00
202	19.75	25.50	31.00	32.50	33.50	35.75	38.75	42.50	42.50
301	19.25	23.75	31.00	36.75	32.00	36.00	38.00	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00
303	21.75	27.75	34.75	40.00	39.00	41.00	43.00	47.25	47.25
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25
304L	20.25	26.50	32.00	37.25	34.50	36.25	38.25	40.25	44.50
305	23.25	30.50	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	25.00	32.00	40.00	42.75	40.25	47.50	51.75	54.00	54.00
309	32.50	41.25	48.25	55.00	54.00	56.75	60.25	69.00	69.00
310	39.75	50.50	64.75	71.00	72.25	76.50	78.25	81.75	81.75
314	33.00	41.75	52.75	59.75	60.75	62.75	66.00	70.25	79.25
316	39.00	47.75	60.75	67.75	69.75	73.00	77.25	81.75	81.75
316L	30.75	39.50	47.25	54.75	52.75	55.50	60.00	65.50	68.50
317	40.25	51.25	65.75	76.50	74.75	78.50	81.00	87.75	87.75
321	26.50	33.50	39.75	45.75	45.00	47.25	51.25	56.25	56.25
18-8CbTa	30.75	39.50	47.25	54.75	52.75	55.50	60.00	65.50	68.50
403	28.75	32.75	38.75	44.75	43.25	45.00	48.25	52.25	52.25
405	17.50	23.00	28.75	31.00	32.25	30.50	32.00	33.75	42.25
410	15.00	19.50	25.50	28.50	28.00	29.00	30.50	31.75	38.25
416	26.00	30.00	36.00	42.00	39.00	41.00	43.00	47.25	47.25
420	30.25	31.00	38.00	44.00	37.75	35.00	37.25	40.75	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	36.75
430F	26.50	33.50	39.75	45.75	45.00	47.25	51.25	56.25	56.25
431	25.50	33.25	39.75	45.75	45.00	47.25	51.25	56.25	56.25
446	35.50	49.50	63.25	73.25	72.25	76.50	81.00	87.75	87.75

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Arco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Elwood Ivins Steel Tube Works Inc.; Firth Harris Co.; Eastern Stainless Steel Corp.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessep Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Pine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spence Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Tachalloy Co. Inc.; Tumian Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ubrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates	Sheets
	Carbon Base	Carbon Base
	10%	30%
302	31.55	37.95
304	34.10	40.90
304-L	36.50	42.75
316	42.50	50.10
316-L	42.50	50.10
316-CB	33.25	39.65
321	36.20	44.35
347	28.35	33.85
405	28.85	33.35
410	28.85	33.35
430	28.85	33.35
Inconel	50.00	65.95
Nickel	41.60	56.15
Nickel, Low Carbon	43.80	60.55
Monel	44.50	60.50
Copper*	42.15	42.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. B18.

Tool Steel

Grade	Carbon	\$ per lb	Grade	Carbon	\$ per lb
Regular	0.275	0.330	W-Cr	0.430-0.460	0.450
Extra	0.330	0.390	V-Cr	0.470	0.470
Special	0.390	0.430	Hi-Carbon-Cr	0.770	0.770
Oil Hardening	0.430				

W	Cr	V	Co	Mo	\$ per lb
20.25	4.25	1.6	12.25		4.990
18.25	4.25	1	4.75		2.305-2.475
18	4	2	9		2.675-2.675
18	4	2			1.765
18	4	1			1.690
13.75	3.75	2	5		2.245
13.5	4	3			1.865
9	3.5				1.165
6	4	2			1.350
6	4	3			0.960
1.5	4	1			0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, R8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross tons, as reported to STEEL. Minimum delivered prices are approximate and do not include 2% federal tax.

Birmingham District				Youngstown District			
	Basic	No. 2 Foundry	Malleable	Bessemer	Basic	No. 2 Foundry	Malleable Bessemer
Alabama City, Ala. R2	\$4.50	.....	.....	.....	Hubbard, O. Y1	.....	60.50
Birmingham R2	\$4.50	\$5.00 ¹	.....	.....	Sharpsville, Pa. R0	62.50	61.00
Birmingham U8	.....	\$9.00 ¹	.....	.....	Youngstown Y1	.....	60.50
Woodward, Ala. W15	\$8.50	\$9.00 ¹	63.00	.....	Manassas, O., deid.	64.90	65.90
Cincinnati, deid.	.....	66.70	.....	.....	Duluth I-3	62.50	63.00
Buffalo District				Erie, Pa. I-3			
Buffalo H1, R2	60.00	60.50	61.00	61.50	Everett, Mass. R1	63.25	63.75
Tonawanda, N.Y. W12	60.00	60.50	61.00	61.50	Fontana, Calif. K1	70.00	70.50
N. Tonawanda, N.Y. T9	.....	63.00	63.50	64.00	Geneva, Utah C11	60.00	60.50
Boston, deid.	70.65	71.15	71.65	.....	Granite City, Ill. G4	61.99	62.40
Rochester, N.Y., deid.	63.52	63.52	64.02	.....	Ironton, Utah C11	66.00	60.50
Syracuse, N.Y., deid.	64.12	64.62	65.12	.....	Lone Star, Texas L6	.....	55.00 ²
Chicago District				Minnequa, Colo. C10			
Chicago I-3	62.50	63.00	63.00	63.50	Rockwood, Tenn. T3	.....	55.00 ¹
Gary, Ind. U5	60.00	.....	60.50	.....	Toledo, O. I-3	62.50	63.00
S. Chicago, Ill. R2	60.00	.....	60.50	.....	Cincinnati, deid.	68.25	68.75
S. Chicago, Ill. Y1	60.00	60.50	60.50	61.00	*Phos. 0.51-0.75%; \$50, Phos. 0.31-0.50%.		
S. Chicago U8	60.00	.....	60.50	61.00	†Phos. 0.70-0.90; intermediate (Phos. 0.31-0.70%), \$60		
S. Chicago, Ill. W14	62.50	.....	63.00	63.50	‡Phos. 0.70-0.90; intermediate (Phos. 0.31-0.69%), \$56		
Milwaukee deid.	64.80	65.30	65.30	65.80	PIG IRON DIFFERENTIALS		
Muskegon, Mich. deid.	.....	69.65	69.65	.....	Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phosphorus iron on which base is 1.75-2.00%.		
Cleveland District				Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.			
Cleveland R2, A7	60.00	60.50	60.50	61.00	Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add \$2 per ton and each additional 0.25%, add \$1 per ton.		
Akron, O., deid.	62.75	63.25	63.25	63.75	BLAST FURNACE SILVERY PIG IRON, Gross Ton		
Mid-Atlantic District				(Base 6.90-6.50% silicon; add \$1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)			
Bethlehem, Pa. B2	62.00	62.50	63.00	63.50	Jackson, O. I-3, J1	.....	69.00
New York, deid.	66.50	65.70	66.20	66.70	Buffalo H1	.....	70.25
Birdsboro, Pa. H10	64.50	65.00	65.50	66.00	ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton		
Chester, Pa. P14	62.00	62.00	63.00	.....	(Base 14.01-14.50% silicon; add \$1 for each 0.5% Si to 18%; \$1 for each 0.50% Mn over 1%; \$2 per gross ton premium for 0.045% max P)		
Philadelphia, deid.	63.78	64.28	64.70	.....	Niagara Falls, N.Y. F15	.....	\$92.50
Steelton, Pa. B2	62.00	62.50	63.00	63.50	Keokuk, Iowa, Open-hearth & Fdry, (freight allowed K2)	.....	97.00
Swedesland, Pa. A3	64.50	65.00	65.50	66.00	Keokuk, O. H. & Fdry, 12% lb piglets, 16% Si, frgt allowed K2	.....	100.00
Philadelphia, deid.	66.28	66.78	67.28	67.78	LOW PHOSPHORUS PIG IRON, Gross Ton		
Troy, N.Y. R2	62.00	62.00	63.00	63.50	Lyle, Tenn. T3 (Phos. 0.035% max)	.....	\$72.50
Pittsburgh District				Rockwood, Tenn. T3 (Phos. 0.035% max)			
Neville Island, Pa. P8	62.50	63.00	63.00	63.50	Steelton, Pa. B2 (Phos. 0.035% max)	.....	68.00
Pittsburgh (N&S sides),	.....	64.45	64.45	64.95	Philadelphia, deid.	.....	71.55
Alliquipp, deid.	.....	64.10	64.10	64.63	Troy, N.Y. R2 (Phos. 0.035% max)	.....	68.00
McKees Rocks, deid.	.....	64.10	64.10	64.63	Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	.....	65.00
Lawrenceville, Homestead,	.....	64.76	64.76	65.29	Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	.....	67.50
Wilmerding, Monaca, deid.	.....	65.32	65.32	65.85	Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	.....	67.50
Verona, Trafford, deid.	64.79	65.29	65.60	66.13	Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	.....	67.50
Hrschenridg, deid.	65.10	65.60	65.60	66.13			
Bessemer, Pa. U5	60.00	.....	60.50	61.00			
Clariton, Rankin, & Duquesne, Pa. U5	60.00	.....	.....	.....
Midland, Pa. C18	60.00	.....	.....	.....

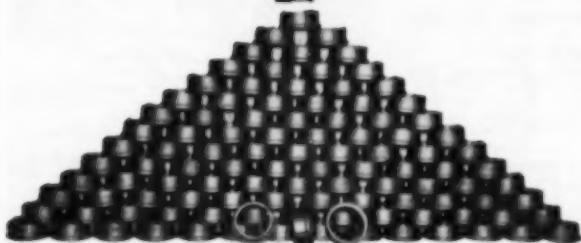
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS			STRIP Hot-Rolled*	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†		H.R. Mar. chem. Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††		Carbon	Floor
Atlanta	7.14	8.20	8.57	7.40	7.42	7.99	8.39	7.63	7.49	9.45	
Baltimore	7.74	8.60	9.00	8.20	8.20	8.73	8.99*	8.44	8.06	9.62	
Birmingham	7.63†	8.50†	8.85†	7.71	7.77	8.95	.....	7.93	7.95	10.00
Boston	8.02	9.57	10.82	8.71	8.71	9.28	10.36	8.77	8.91	10.34	
Buffalo	7.70	8.50	10.51	7.85	7.85	8.85	8.40	8.10	8.30	9.50	
Chattanooga	7.78†	8.69†	8.60†	7.85	7.92	8.45	.....	8.13	8.10	9.82
Chicago	7.63	8.49	9.60	7.71	7.77	8.30	8.25	7.93	7.95	9.22	
Cincinnati	7.75	8.48	9.60	7.95	8.01	8.54	8.65	8.40	8.24	9.47	
Cleveland	7.63	8.49	9.45	7.81	7.83	8.38	8.50	8.26	8.12	9.39	
Denver	8.95	10.31	11.73	9.10	9.10	.....	9.82	8.95	9.10	10.50
Detroit	7.82	8.68	9.88	7.99	8.05	8.58	8.54	8.40	8.23	9.41	
Erie, Pa.	7.08	8.24	8.95 ¹⁰	7.31	7.35	.....	8.10 ¹⁰	7.65	7.30	8.79
Houston	7.55	8.75	10.49	8.15	8.25	.....	9.93	8.20	8.00	9.20
Jackson, Miss.	7.90†	8.77†	9.22†	7.94	8.09	8.62	.....	8.25	8.27	9.94
Los Angeles	8.15	10.00	11.60	8.50	8.15	8.70	10.90	8.30	8.75	10.85	
Milwaukee	7.72	8.55	9.60	7.80	7.88	8.39	8.44	8.10	8.04	9.31	
Moline, Ill.	7.48	8.59	9.45	7.56	7.62	.....	8.10	7.75	7.80	.....
New York	8.25	9.13	10.13	88.13	8.73	8.64	9.21	10.27	8.61	8.71	
Norfolk, Va.	7.35	.....	.....	7.80	7.85	.....	9.95	8.10	7.60	9.10
Philadelphia	7.84	8.69	9.91	8.49	8.23	8.78	9.02	8.85	8.25	9.33	
Pittsburgh	7.63	8.74	9.90	82.60	7.81	7.77	8.30	8.00	7.93	9.22	
Portland, Oreg.	8.30	8.80	10.80	8.55	8.25	.....	12.55	8.20	8.20	10.10
Richmond, Va.	7.80	.....	9.90	8.45	8.45	8.50	10.00	8.70	8.15	9.85
St. Louis	7.92	8.78	9.80	8.60	8.06	8.59	8.79	8.33	8.24	9.51	
St. Paul	7.83	8.78	9.80	7.91	7.97	.....	8.70	8.13	8.15	9.42
San Francisco	8.20	9.65	10.65	8.65	8.15	8.70	11.45	8.25	8.30	10.50	
Seattle	8.75	10.50	10.90	8.90	8.60	9.15	12.25	8.50	8.50	10.70	
Spokane, Wash.	9.25	11.40	11.40	9.40	9.10	9.65	12.75	9.00	9.00	11.70	
Washington	8.31	10.43	.....	8.99	8.74	.....	9.90	9.02	8.64	11.10

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50 lb zinc at Los Angeles and 13.50 at other points), except in Birmingham (coating extra excluded); ‡includes 20-cent bar quality extra; §1/4-in. and heavier; ¶has annealed; ††4 in. and under.
 Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 4000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 3999 lb; †—400 to 999 lb; ††—2000 to 3999 lb; †††—2000 lb and over.

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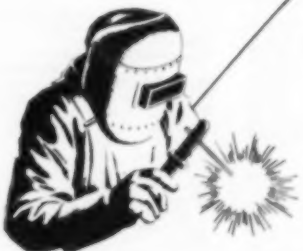


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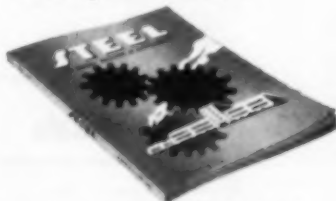
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Refractories

Fire Clay Brick (per 1000)
High-Heat Duty: Ashland, Grahn, Hayward, Mitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Parber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., \$128; Salina, Pa., \$123; Niles, O., \$128; Cutler, Utah, \$148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, \$165; Stephens Pottery, Ga., \$175.

Silica Brick (per 1000)
Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Ft. Matilda, Pa., Portsmouth, O., Hawstone, Pa., \$140; Warren, Niles, Windham, O., Hays, Latrobe, Pa., Morrisville, Pa., \$145; E. Chicago, Ind., Joliet, Rockdale, Ill., \$150; Lehigh, Utah, \$165; Los Angeles, \$170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., \$167; Morrisville, Latrobe, Pa., \$160; Cutler, Calif., \$182.

Semisilica Brick (per 1000)
 Clearfield, Pa., \$145; Philadelphia, \$124; Wood-bridge, N. J., \$122.

Ladle Brick (per 1000)
Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vannort, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., \$96; Clearfield, Pa., Portsmouth, O., \$98.

High-Alumina Brick (per 1000)
As Per Cent: St. Louis, Mexico, Vandalia, Mo., \$220; Danville, Ill., \$223; Philadelphia, Clearfield, Pa., \$230.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., \$275; Danville, Ill., \$278; Philadelphia, Clearfield, Pa., \$285.
70 Per Cent: St. Louis, Mexico, Vandalia, Mo., \$315; Danville, Ill., \$318; Philadelphia, Clearfield, Pa., \$325.

Sleeves (per 1000)
 Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, \$177; Clearfield, Pa., \$189.

Nazules (per 1000)
 Reesdale, Johnstown, Pa., \$292; Clearfield, Pa., \$311; St. Louis, Bridgeburg, Pa., \$292.

Rumors (per 1000)
 Reesdale, Johnstown, Bridgeburg, Pa., \$221; Clearfield, Pa., \$236.

Dolomite (per net ton)
 Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nardo, O., \$15; Thornton, McCook, Ill., \$15.60; Dolly Siding, Bonne Terre, Mo., \$14.

Magnesite (per net ton)
 Domestic, dead-burned, bulk 1/2-in. grains with fines: Chewelah, Wash., \$43; Luning, Nev., \$43. 3/4-in. grains with fines: Baltimore, \$38.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF₂ content: 72.5%, \$38-39; 70%, \$35-38; 60%, \$31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, \$34; Mexican, \$26.50.

Ores

Lake Superior Iron Ore
 (Prices effective for the 1956 shipping season, gross tons, 51.60% iron natural, rail of vessel, lower lake ports.)

Old range bessemer \$11.25
 Old range nonbessemer 11.10
 Mesabi bessemer 11.00
 Mesabi nonbessemer 10.85
 Open-hearth lump 12.18
 High phos. 18.55

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore
 Cents per unit, deid. E. Pa.
 Foundry and basic 52-52% concentrates contract 17.00-18.00

Foreign Iron Ore
 Cents per unit, c.i.f. Atlantic ports
 Swedish basic, 65% 25.00
 N. African hematite (spot) nom. 24.00-25.00
 Brazilian iron ore, 68-69% 33.00

Tungsten Ore
 Net ton unit, before duty
 Foreign, wolframite, good commercial quality \$32.50-33.00
 Domestic, scheelite, mine 63.00

Manganese Ore
 Mn 48%, contracts, nominally \$1.35-\$1.40, per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47% \$1.10-\$1.15. Spot cargoes, 10 to 15% higher.

Local Iron Ore
 Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, E. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African
 48% 3:1 \$52.00-\$53.50
 48% 2.8:1 nom. 49.00-50.00
 48% no ratio 39.00-40.00

South African Transvaal
 48% no ratio \$35.00-\$36.00
 44% no ratio 25.00-26.00

Domestic
 Rail nearest seller
 18% 3:1 \$39.00

Molybdenum
 Sulphide concentrate, per lb of Mo content, mines, unpacked \$1.10

Antimony Ore
 Per unit of Sb content, c.i.f. seaboard
 55-60% \$3.35-\$3.80
 60-65% 3.80-3.90

Vanadium Ore
 Cents per lb V₂O₅
 Domestic 31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted) Cents

Sponge Iron: Swedish, c.i.f., Camden, N. J., c.i. in bags .. 8.50

Domestic:
 F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags 9.50
 F.o.b., Riverton, N. J., in bags 8.50

Canadian, f.o.b. shipping point 9.50

Electrolytic iron:
 Melting stock, 99.9% Fe, irregular fragments of 1/2 in. x 1.3 in. 22.00
 Annealed, 99.5% Fe, 24.50
 Unannealed (99+% Fe) 34.00

Unannealed (99+% Fe) (minus 320 mesh) 57.00

Powder Flakes (minus 18, plus 100 mesh) .. 31.00

Carbonyl Iron:
 98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.

Aluminum:
 Atomized, 500 lb. drum freight allowed
 Carlots 36.20
 Ton lots 38.20

Antimony, 500 lb lots 32.00*

Brass, 5000-lb lots 39.75-51.00*

Bronze, 5000-lb lots 61.25-65.00*

Copper:
 Electrolytic 14.25*
 Reduced 14.25*

Lead 7.50*

Manganese:
 Minus 35 mesh 64.00
 Minus 100 mesh 70.00
 Minus 200 mesh 75.00

Nickel, unannealed ... \$1.00

Nickel-Silver, 5000-lb lots 59.25-62.25*

Phosphor-Copper, 5000-lb lots 67.66

Silicon 47.50

Solder 7.00*

Stainless Steel, 302 ... 99.00

Stainless Steel, 316 ... \$1.32

Tin 14.50*

Zinc 5000-lb lots 19.75-33.00*

Tungsten:
 Melting grade, 99% 8 60
 40 to 200 mesh: 10 60
 1000 lb and over ... 4.50
 Less than 1000 lb. ... 4.65

Chromium, electrolytic 17 60

99.8% Cr min. 17 72

20 84

20 90

24 72, 84

24 96

30 84

40, 35 110

40 100

Cu, 15% Zn, 18% Ni.

*Plus coat of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 30% Zn, 10% Ni. **94%

Electrodes

Threaded with nipple; unboxed. f.o.b. plant

GRAPHITE		Per 100 lb
Inches	Length	
Diam	Length	\$52.50
2	24	33.75
3	30	32.00
4	40	30.25
5	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON		Per 100 lb
Inches	Length	
8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
16	72	10.85
17	60	10.75
17	72	10.25
20	84	10.30
20	90	10.10
24	72, 84	16.30
24	96	10.20
30	84	10.20
40, 35	110	9.90
40	100	9.90

Imported Steel

(Base per 100 lb, landed, duty paid, source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars Intermediate, ASTM-A 308	\$7.05	\$7.05	\$7.05	\$7.45
Bar Steel Angles	6.90	6.90	6.90	7.30
Structural Angles	7.45	7.45	7.45	7.85
I-Beams	7.65	7.65	7.65	8.05
Plates	8.90	8.90	8.90	9.30
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Purring Channels, C.R., 1000 ft, 1/2 x 0.30 lb per ft	26.50	26.50	26.50	30.46
Barbed Wire (1)	6.50	6.50	6.50	6.85
Merchant Bars	7.60	7.60	7.60	7.40
Hot-Rolled Bands	7.50	7.50	7.50	7.90
Wire Rods, Thomas Commercial No. 8	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 8	4.90	6.90	6.90	7.30
Bright Common Wire Nails	7.80	7.80	7.80	8.10
Oil Country Pipe; Mills withdrawn for remainder of the year.				

†Per 82-lb. net, real. ‡Per 100-lb kegs, 20d nails and heavier

Metallurgical Coke

Price per net ton
Beehive Ovens
 Connellsville, furnaces \$13.75-14.50
 Connellsville, foundry 16.00-17.00

Oven Foundry Coke
 Birmingham, ovens \$25.65
 Cincinnati, deld. 30.58
 Buffalo, ovens 27.50
 Camden, N. J., ovens 26.50
 Detroit, ovens 27.50
 Pontiac, deld. 29.15
 Saginaw, deld. 30.73
 Erie, Pa., ovens 27.50
 Everett, Mass., ovens 28.50
 New England, deld. 26.75
 Indianapolis, ovens 26.00
 Ironton, O., ovens 26.00
 Cincinnati, deld. 26.75
 Kearny, N. J., ovens 19.50
 Lone Star, Tex., ovens 27.50
 Milwaukee, ovens 26.25
 Neville Island (Pittsburgh), Pa., ovens 27.50
 Painesville, O., ovens 29.43
 Cleveland, deld. 26.50
 Philadelphia, ovens 28.50
 St. Louis, ovens 26.50
 St. Paul, ovens 26.50
 Chicago, deld. 26.80
 Swedeland, Pa., ovens 26.80
 Terra Haute, Ind., ovens 26.75

*Or within \$4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens
 Pure benzene 36.00
 Toluene, one deg. 32.00-34.00
 Industrial xylene 32.00-35.00
 Per ton, bulk, ovens
 Ammonium sulfate \$32.00
 Birmingham area 36.00
 Cents per pound, producing point
 Phenol: Grade 1, 15.00; Grade 2-3, 14.50;
 Grade 4, 16.00; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegel Eisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, \$96.50; 19-21% Mn, 1-3% Si, \$94; 16-19% Mn, \$92.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton \$215. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Ore. Add or subtract \$2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump \$223 per net ton, f.o.b. Anconada or Great Falls, Mont. Add \$2.60 for each 1% above 81%; subtract \$2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump bulk, max. 0.07% C. \$1.95 per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C. 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. Special Grade: (Mn 90% min, C 0.05% max, P, 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.5c per lb of contained Mn, packed, carload 23.5c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 3300 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O. freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 15-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Ore. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot 2" x D, \$1.50 per lb of contained Ti; less ton \$1.55. (Ti 38-43%, Al 5% max, Si 4% max, C 0.10% max). Ton lot \$1.35, less ton \$1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract \$200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract \$225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.55c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 39.25c, 0.03% max 38.75c, 0.06% max 37.25c, 0.1% max 36.75c, 0.15% max 36.50c, 0.2% max 36.25c, 0.5% max 36.00c, 1.0% max 35.25c, 1.5% max 35.10c, 2.0% max 35.00c. Ton lot, add 3.1c, less ton add 4.5c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferroallicum Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about 1/4" thick) \$1.25 per lb, ton lots \$1.27, less ton lots \$1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovandium: Open-hearth Grade (V 50-55%, Si 5% max, C 3% max). Contract, any quantity, \$3.10 per lb of contained V. Delivered. Spot, add 10c. Special Grade (V 50-55% or 70-75%, Si 2% max, C 0.5% max) \$3.20. High Speed Grade (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) \$3.30.

Grainal: Vanadium Grainal No. 1, \$1.05 per lb; No. 6, 60c; No. 79, 60c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, \$1.33 per lb contained V₂O₅, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Ore. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lot, 18c; less ton 19.25c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.8c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 29.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alloys: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.05c per lb of alloy, ton lot, packed, 11.5c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.8c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

25-40% Zirconium Alloy: (Zr 25-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, \$1.20 per lb of alloy; less than 100 lb \$1.36. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10 1/4% B) 85c per pound; Grade B (14-15% B) \$1.20; Grade C (19% min B) \$1.50.

Borax: (B to 4% B, 40 to 45% Si), \$5.25 per lb contained B, delivered to destination.

Boratan: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carboratan: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 63-69%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.05c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRICQUETTED ALLOYS

Chromium Briquets: (Weighting approx. 3% lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.95c; less than 2000 lb in bags 19.05c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighting approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3500 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.3c less ton 16.1c. Delivered. Add 0.35c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighting approx. 3 1/2 lb and containing 2 lb of Mn and approx. 1/2 lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighting approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l., bags, 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighting approx. 2 1/2 lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdenum Oxide Briquets: (Containing 2% lb of Mo each) \$1.33 per pound of Mo contained, f.o.b. Langloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more \$3.45 per lb of contained W; 2000 lb W to 5000 lb W, \$3.55; less than 2000 lb W, \$3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 3" x D, \$6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum-Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots, 3" x D, \$4.65 per lb of contained Cb plus Ta, delivered; less ton lots \$4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed 1/2-in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphitex No. 51: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Stimax: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrinophosphorus: (23-25% based on 24% P content with unitage of \$4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., \$99 per gross ton.

Ferromolybdenum: (55-75%). Per lb—contained Mo, in 200-lb containers, f.o.b. Langloth, Pa., \$1.54 in all sizes except powdered which is \$1.64; Washington, Pa., furnace, \$1.54.

Technical Molybdenum Oxide: Per lb contained Mo, f.o.b. Langloth, Pa.; \$1.31 in cans; in bags, \$1.30, f.o.b. Langloth and Washington, Pa.

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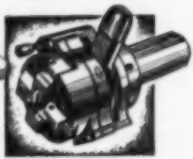
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Demand Pushes Scrap Up

Active buying of prime steelmaking grades by large mills as strike ends gives impetus to uptrend in evidence recently. Prices up over \$10 at some consuming points

Scrap Prices, Page 174

Pittsburgh—Prices on steelmaking grades of scrap are up \$9 to \$10 per ton in this market, based on one sale of No. 1 to a nearby mill at \$56, and substantial purchases in the Valley of electric furnace grades at \$63 and \$65. Immediate Pittsburgh district mills are not buying at the moment, the last representative purchase being at \$51 a week ago. Mill inventories are reported substantial.

Cleveland — Scrap prices are jumping here and in the Valley. While there has been no representative buying by local mills, sales of electric furnace grades in the Valley have been made at \$63 and \$65 a ton. At least three Valley area mills bought at those figures. Dealer industrial scrap, it is said, can be moved at those levels. The soaring prices reflect the high bids on Michigan auto lists. Prices were the equivalent of \$66 per ton, delivered, Valley.

Philadelphia—The last important purchase of prime open-hearth steel in this district was by U.S. Steel's Fairless Works at \$52, delivered.

The Fairless Works also bought No. 2 heavy melting at \$44, delivered, and No. 2 bundles at \$41; it has purchased No. 1 cupola cast at \$52, and heavy breakable at \$54. Drop broken machinery cast is quoted at \$56.

Chicago—The stronger tone in scrap is gaining momentum. An important mill that was closed is offering \$52 for No. 1 industrial heavy melting steel, \$53 for factory bundles and \$54 for electric furnace material—\$4 advances over its last purchases. Only industrial material is involved.

Boston—Steel scrap advanced an average of \$4 a ton for No. 1 heavy melting steel. Lighter steel grades display comparative strength. Brokers are offering slightly firmer prices on cast.

New York—Scrap brokers have advanced buying prices \$2 a ton

on the major open-hearth grades and have made varying upward revisions in most other iron and steel items. Consumer demand is active.

Buffalo — Prices are nominal pending the placing of new business. Traders expect another hike of around \$2 a ton after mills resume operations. Strength at Pittsburgh and in the Valley is likely to be reflected here. Local dealers are talking in terms of around \$47 for No. 1 heavy melting against \$45 paid on purchases prior to the strike.

Cincinnati—The end of the steel strike signaled a sharp upward movement in scrap prices. No. 1 steel advanced \$9.50 a ton, to \$52.50-\$53.50, highest since early May.

Detroit—The scrap market is re-

covering from its wild surge following the opening of this month's auto lists. Last week saw the highest price (over \$60) ever paid for scrap bundles in Detroit. Prices are expected to go higher next week.

Birmingham—While no open-hearth scrap has been purchased by local mills in anticipation of the strike settlement, brokers think mills will be in the market for tonnage when they resume operations. In view of short yard supplies due to heavy shipments to northern markets, higher prices are anticipated.

Los Angeles—Scrap prices are expected to advance sharply now that the steel strike has ended. In recent weeks, collections dropped off sharply. A shortage of supplies before year's end is predicted by some traders.

Seattle—The scrap market is unchanged. Prices are nominal. The two independent mills in Seattle and Portland have been buying material in proportion to their consumption, but Bethlehem was out of the market all last month.

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to **ENR**. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Aug. 1	\$53.17
July 25	47.50
July Avg.	47.00
Aug. 1955	43.97
Aug. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	55.00-56.00
No. 2 heavy melting	47.00-48.00
No. 1 bundles	55.00-56.00
No. 2 bundles	44.00-45.00
No. 1 busheling	55.00-56.00
Machine shop turnings	31.00-34.00
Mixed borings, turnings	31.00-34.00
Short shovel turnings	37.00-38.00
Cast iron borings	37.00-38.00
Cast structural, 1 ft	59.00-60.00
lengths	59.00-60.00
Heavy turnings	45.00-46.00
Punchings & plate scrap	59.00-60.00
Electric furnace bundles	59.00-60.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	44.00-45.00
Heavy breakable cast	44.00-45.00
Unstripped motor blocks	32.00-33.00
No. 1 machinery cast	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt	56.00-57.00
Rails, 2 ft and under	67.00-68.00
Rails, 18 in. and under	68.00-69.00
Rails, random lengths	63.00-64.00
Railroad specialties	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	380.00-370.00
18-8 turnings	250.00-270.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	41.00-42.00
No. 1 bundles	56.00-57.00
No. 2 bundles	37.00-38.00
No. 1 busheling	56.00-57.00
Machine shop turnings	32.50-33.50
Mixed borings, turnings	36.50-37.50
Short shovel turnings	36.50-37.50
Cast iron borings	36.50-37.50
Low phos.	59.00-60.00
Cast structural plates	64.00-65.00
2 ft and under	64.00-65.00
Alloy free, short shovel	41.00-42.00
turnings	41.00-42.00
Electric furnace bundles	59.00-60.00

Cast Iron Grades

No. 1 cupola	54.00-55.00
Charging box cast	40.00-41.00
Heavy breakable cast	44.00-45.00
Stove plate	51.00-52.00
Unstripped motor blocks	29.00-30.00
Brake shoes	39.00-40.00
Clean auto cast	54.00-55.00
Burnt cast	39.00-40.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	59.00-60.00
R.R. malleable	60.00-61.00
Rails, 2 ft and under	73.00-74.00
Rails, 18 in. and under	74.00-75.00
Rails, random lengths	61.00-62.00
Cast steel	62.00-63.00
Railroad specialties	62.00-63.00
Uncut tires	62.00-63.00
Angles, splice bars	69.00-70.00
Rails, rerolling	71.00-72.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)	
18-8 bundles, solids	380.00-390.00
18-8 turnings	250.00-260.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-55.00

YOUNGSTOWN

No. 1 heavy melting	59.00-60.00
No. 2 heavy melting	44.00-45.00
No. 1 bundles	59.00-60.00
No. 2 bundles	40.00-41.00
No. 1 busheling	59.00-60.00
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	62.00-63.00
Electric furnace bundles	62.00-63.00

Railroad Scrap

No. 1 R.R. heavy melt	61.00-62.00
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CHICAGO

No. 1 heavy melting	44.00-48.00
No. 2 heavy melting	43.00-44.00
No. 1 factory bundles	52.00-53.00
No. 1 dealer bundles	49.00-50.00
No. 2 bundles	36.00-37.00
No. 1 busheling	48.00-52.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	27.00-28.00
Short shovel turnings	27.00-28.00
Cast iron borings	27.00-28.00
Cast structural, 1 ft	58.00-59.00
Punchings & plate scrap	59.00-60.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Stove plate	43.00-44.00
Unstripped motor blocks	37.00-38.00
Clean auto cast	53.00-54.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt	55.00-56.00
R.R. malleable	62.00-63.00
Rails, 2 ft and under	72.00-73.00
Rails, 18 in. and under	73.00-74.00
Angles, splice bars	67.00-68.00
Rails, rerolling	73.00-74.00

Stainless Steel Scrap

18-8 bundles & solids	380.00-395.00
18-8 turnings	270.00-280.00
430 bundles & solids	105.00-110.00
430 turnings	52.50-57.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	49.00
No. 2 heavy melting	39.00
No. 1 bundles	51.00
No. 2 bundles	36.00
No. 1 busheling	48.00
Machine shop turnings	26.00
Mixed borings, turnings	26.00
Short shovel turnings	30.00
Punchings & plate scrap	61.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	38.00
Stove plate	38.00
Heavy breakable	38.00
Unstripped motor blocks	28.00
Clean auto cast	51.00
Malleable	51.00

BIRMINGHAM

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	38.00-39.00
No. 1 bundles	40.00-41.00
No. 2 bundles	30.00-31.00
No. 1 busheling	40.00-41.00
Cast iron borings	22.00-23.00
Short shovel turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades

(F.o.b. shipping point)	
No. 1 cupola	50.00-51.00
Stove plate	48.00-49.00
Bar Craps and plate	54.00-55.00
Structural & plate, 2 ft	53.00-54.00
Unstripped motor blocks	40.00-41.00
Charging box cast	35.00-36.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt	49.00-50.00
Rails, 18 in. and under	62.00-63.00
Rails, rerolling	64.00-65.00
Rails, random lengths	59.00-60.00
Angles, splice bars	58.00-59.00

PHILADELPHIA

No. 1 heavy melting	54.00
No. 2 heavy melting	46.00
No. 1 bundles	54.00
No. 2 bundles	43.00
No. 1 busheling	54.00
Electric furnace bundles	56.00
Mixed borings, turnings	37.00-38.00
Short shovel turnings	42.00
Heavy turnings	53.00
Structural & plates	57.00-58.00
Couplers, springs, wheels	64.00
Rail crops, 2 ft & under	69.00-70.00

Cast Iron Grades

No. 1 cupola	52.00
Malleable	65.00-67.00
Heavy breakable cast	54.00
Drop broken machinery	56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	47.00-48.00
No. 2 heavy melting	38.00-39.00
No. 1 bundles	47.00-48.00
No. 2 bundles	35.00-37.00
Machine shop turnings	26.00-27.00
Mixed borings, turnings	27.00-28.00
Short shovel turnings	31.50-32.50
Low phos. (structural & plate)	43.00-50.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Unstripped motor blocks	34.00-35.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips, solids	340.00-350.00
18-8 borings, turnings	170.00-180.00
430 sheets, clips, solids	120.00-135.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	32.50-33.50
No. 1 bundles	44.00-45.00
No. 2 bundles	31.00-32.00
No. 1 busheling	41.00-42.00
Machine shop turnings	24.00-24.50
Mixed borings, turnings	26.50-27.50
Short shovel turnings	28.00-29.00
No. 1 cast	43.00-43.50
Mixed cupola cast	38.50-39.00
No. 1 machinery cast	44.50-45.00

BUFFALO

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	44.00-45.00
No. 2 bundles	31.00-32.00
No. 1 busheling	44.00-45.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	29.00-30.00
Low phos.	49.00-50.00

Cast Iron Grades

(F.o.b. shipping point)	
No. 1 cupola	44.00-45.00
No. 1 machinery	49.00-50.00

Railroad Scrap

Rails, random lengths	67.00-68.00
Rails, 3 ft and under	81.00-82.00
Railroad specialties	50.00-51.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	52.50-53.50
No. 2 heavy melting	44.50-45.50
No. 1 bundles	52.50-53.50
No. 2 bundles	40.50-41.50
No. 1 busheling	52.50-53.50
Machine shop turnings	32.50-33.50
Mixed borings, turnings	34.50-35.50
Short shovel turnings	36.50-37.50
Cast iron borings	34.50-35.50
Low phos., 18 in.	64.00-65.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable cast	46.00-47.00
Charging box cast	46.00-47.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	52.00-53.00
Rails 18 in. and under	69.50-70.50
Rails random lengths	61.00-62.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	42.00
No. 2 heavy melting	40.00
No. 1 bundles	46.00
No. 2 bundles	36.00
No. 1 busheling	46.00
Machine shop turnings	26.00
Short shovel turnings	30.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	40.00
Heavy breakable cast	20.00
Unstripped motor blocks	39.00
Brake shoes	49.50
Clean auto cast	50.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt	56.25
Rails, 18 in. and under	67.00
Rails, random lengths	67.00
Rails, rerolling	75.00
Angles, splice bars	66.00

SEATTLE

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	39.00-40.00
No. 2 bundles	30.00-31.00
No. 1 busheling	29.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	23.00-25.00
Electric furnace No. 1	62.00-64.00

Cast Iron Grades

No. 1 cupola	42.00-45.00
Heavy breakable cast	38.00-39.00
No. 1 wheels	37.00
Unstripped motor blocks	40.00
Stove plate (f.o.b. plant)	30.00-31.00
Brake shoes	38.00

Railroad Scrap

Rails, random lengths	43.00-44.00
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LOS ANGELES

No. 1 heavy melting	41.00
No. 2 heavy melting	37.00
No. 1 bundles	40.00
No. 2 bundles	30.00
Machine shop turnings	21.00

Cast Iron Grades

(F.o.b. shipping point)	
No. 1 cupola	46.00

SAN FRANCISCO

No. 1 heavy melting	43.00
No. 2 heavy melting	42.00
No. 1 bundles	42.00
No. 2 bundles	35.00
Machine shop turnings	20.00-23.00
Mixed borings, turnings	20.00-23.00
Cast iron borings	20.00-23.00
Heavy turnings	20.00-23.00
Short shovel turnings	25.00
Cut structural	45.00
Punchings & plate scrap	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	42.00
Stove plate	39.00
Heavy breakable cast	39.00
Unstripped motor blocks	38.00
Brake shoes	35.00
Clean auto cast	48.00
No. 1 wheels	38.00
Burnt cast	23.00
Drop broken machinery	50.00

HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00</



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Lead, Zinc Sales Brighten

Galvanizers and zinc diecasters should enter the market for substantial tonnages during August. Lead sales improve, although battery makers haven't upped orders

Nonferrous Metal Prices, Pages 178 & 179

ZINC and lead sales are rebounding. "The best part about our lead business," says one producer, "is that sales are improving almost across the board."

While there has been no noticeable change in the orders from battery makers, producers of lead products, petroleum and others are insuring that August will produce substantial sales.

Zinc, Too—With the steel strike settled, zinc men are becoming more optimistic. Mills may have to work off some stockpiled zinc before ordering more, but indications are that mills will be working at fever pitch for the rest of the year. Diecasters will become an important factor as the month goes along. Says one zinc producer: "We are just getting the first murmur from diecasters." This could grow into a roar of new sales before the end of the month.

Tin Price Soars

Tin prices jumped to about \$1 a pound last week. The industry's experts point to four reasons: 1. The tension over the Suez Canal zone. 2. Threatened strike of the Malayan tin workers (Aug. 7). 3.

Threatened Nigerian strike (Aug. 13). 4. Settlement of the steel strike in this country.

Outlook: Consumer demand will mushroom until strike threats abate. High level sales should hold during this month as steel mills strive to get back to normal production schedules.

Copper: Price Jitters

Some 2000 African miners walked off their jobs at the Bancroft Copper Mine (Northern Rhodesia) last week, causing the London Metal Exchange bid quotation to rise to 38.75 cents per pound on Monday, July 30. On Tuesday, the bid price subsided to 37.90 cents per pound. Point of interest: The Bancroft mine is in the development stage and will not be producing until sometime in 1957. Market observers point out that the reason for the nervousness on the LME centers on the fear that Bancroft workers might stir up more unrest and walkouts at other mines.

Domestic primary prices (40 cents a pound) and secondary prices (38 cents a pound) remained unaffected. Primary producers report that brass mills are buying cautiously and that substantial

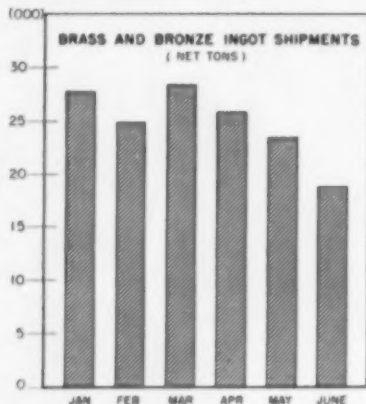
tonnages may not be sold for another week or two. Wire and cable makers continue to buy at record rates.

Aluminum Sales O.K.

Aluminum sales are bullish. Says one producer: "Just as soon as one extruder cancels an order, another takes up the tonnage."

Some aluminum men admit that some of the smaller extruders are

Wait for Price Cuts Reflected by Tumble in Shipments



"pulling in their horns" and that collections from a few customers are slipping.

Strike Notes: 1. Aluminum pot lines must be kept heated even though work stops—(p. 71). The current is reduced so that pots stay warm, keeping the alumina molten. If it were allowed to harden, jackhammers would have to be used to chip it away. This not only could be time consuming, but would endanger the pot lines. 2. Aluminum warehouses have about a 30-day supply of aluminum mill products on hand.

Nickel Memo

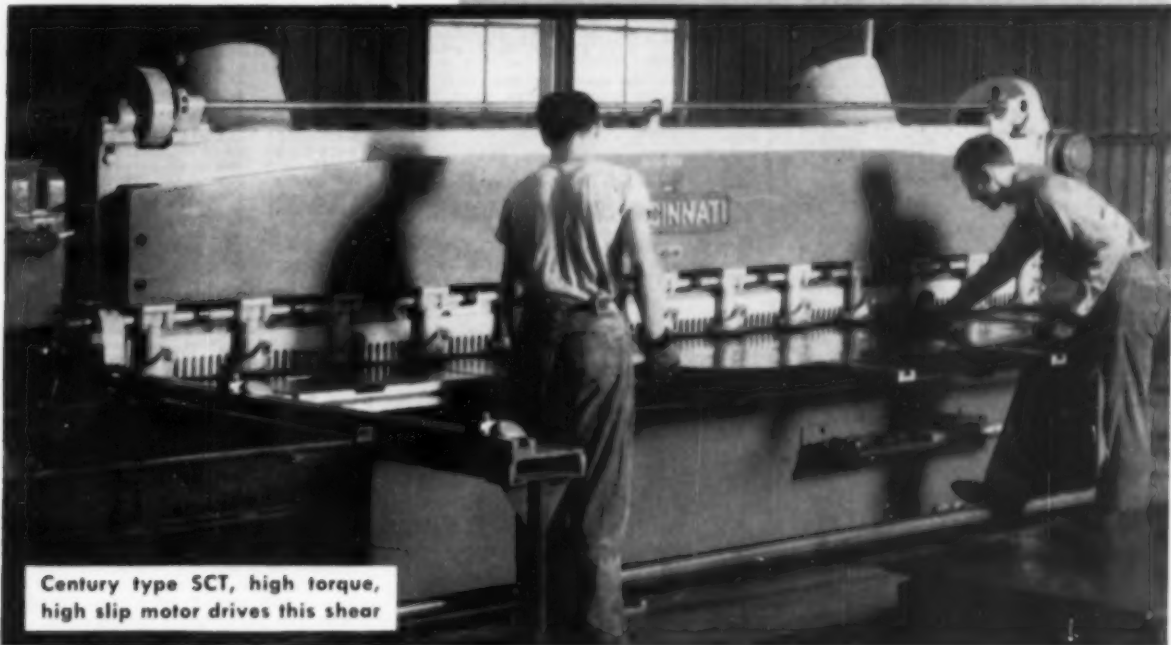
The development of nickel ore bodies in the Mystery-Moak lakes region (page 80) may trigger a series of announcements of new nickel mine fields. It is becoming increasingly clear that demand for nickel will make it profitable to bring in fields that have substantial tonnages of low grade nickel-bearing ores.

DAILY NONFERROUS PRICE RECORD

	Aug. 1 Price	Last Change	Previous Price	June Avg.	May Avg.	July 1955 Avg.
Copper	38.00-40.00	July 13, 1956	37.50-40.00	43.000	45.098	36.000
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	14.800
Sine	13.50	Jan. 8, 1956	13.00	13.500	13.500	12.250
Tin	99.25	Aug. 1, 1956	100.25	94.811	97.024	97.845
Nickel	64.50	Nov. 24, 1954	66.00	64.500	64.500	64.500
Aluminum	25.90	Mar. 29, 1956	24.40-25.90	25.900	25.900	23.200
Magnesium	33.75	Apr. 16, 1956	32.50	33.750	33.750	28.000

Quotations in cents per pound based on: COPPER, deliv. Conn. Valley; LEAD, common grade, deliv. St. Louis; SINE, prime western, E. St. Louis; TIN, Straits, deliv. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deliv.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

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CENTURY ELECTRIC COMPANY

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Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 25.90; pigs, 24.80, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 27.00; No. 43, 5% Si, 27.00; No. 195, 4.5% Cu, 0.5% Si, 29.30; No. 214, 2.4% Mg, 29.90; No. 356, 7% Si, 0.3% Mg, 27.70.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, \$71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, \$74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, \$43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: \$2.25 per lb ton lots.

Cadmium: Sticks and bars, \$1.70 per lb deld. **Cobalt:** 97-99%, \$2.60 per lb for 500-lb keg; \$2.62 per lb for 100-lb case; \$2.67 per lb under 100 lb.

Columbium: Powder, \$119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 38.00 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, \$201.85-\$220 per lb; intrinsic grade, \$220-\$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, \$35 per oz.

Indium: 99.9%, \$2.25 per troy oz.

Iridium: \$190-\$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 90 + %, cups or ingots, \$11.50; rod \$13.50; shot or wire, \$14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 33.75 f.o.b. Velasco, Tex.; ingot, 31.50 f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 35.00 deld.; AZ63A, AZ92A, AZ91C (sand casting), 39.25 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, \$255-\$257 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, \$3.20 per lb; pressed ingot, \$4.06 per lb; sintered ingot, \$5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, \$4.50; 10-lb pigs, unpacked, \$7.60; "XX" nickel shot, \$9.00; "P" nickel shot or ingots for addition to cast iron, \$4.50, prices f.o.b. Port Colborne, Ont., including import duty. New York basis add 0.92.

Osmium: \$50-\$100 per troy oz, nom.

Palladium: \$23-\$34 per troy oz.

Platinum: \$103-\$114 per troy oz from refineries.

Radium: \$16-\$21.50 per mg radium content, depending on quantity.

Rhodium: \$119-\$125 per troy oz.

Ruthenium: \$45-\$55 per troy oz.

Selenium: 99.5%, \$13.50-\$15.50 per lb.

Silver: Open market, 99.125 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, \$68.70 per lb; powder, \$56.63 per lb.

Tellurium: \$1.50-\$1.75 per lb.

Thallium: \$12.50 per lb.

Tin: Straits, N. Y., spot, 99.25; prompt, 99.25.

Tinplate: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), \$3.00; grade A-2 (0.5% Fe max), \$2.70 per pound.

Tungsten: Powder, 99.8%, carbon reduced, 1000-lb lots, \$4.50 per lb, nom. f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, \$5.00. Treated ingot, \$6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.80; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, \$14.40 per lb; low-halium reactor grade, \$23.07. Sponge, commercial grade, \$7.50-\$10.00 per lb, depending on quantity; reactor grade, \$14.00-\$22.00 per lb, depending on quantity. Powder, electronics grade, \$15 per lb; flash grade, \$11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.25-27.25; No. 12 foundry alloy (No. 2 grade), 25.25-26.25; 5% silicon alloy, 0.40 Cu max, 27.50; 13 alloy, 0.40 Cu max, 26.50-27.50; 195 alloy, 26.50-28.00; 109 alloy, 25.50-26.25. Steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 26.00, grade 2, 25.25; grade 3, 24.50; grade 4, 24.00.

Brass Ingot: Red brass, No. 115, 37.55; tin bronze, No. 225, 48.00; No. 245, 43.50; high-leaded tin bronze, No. 305, 41.00; No. 1 yellow No. 465, 29.75; manganese bronze, No. 421, 33.50.

Magnesium Alloy Ingot: AZ63A, 36.00; AZ91B, 35.00; AZ91C, 36.00; AZ92A, 36.00.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, \$1.92; rod, bar, wire, \$1.89.

COPPER WIRE

Bars, soft, f.o.b. eastern mills, 30,000-lb lots, 45.35; i.e.l., 45.98. Weatherproof, 30,000-lb lots, 45.78; i.e.l., 44.53. Magnet wire deld., 15,000 lb or more, 52.65; i.e.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, \$21.50 per cwt; pipe, full coils, \$21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, \$12.60-\$13.10; sheared mill plate, \$10.00-\$12.00; strip, \$12.10-\$12.60; wire, \$9.00-\$11.90; forging billets, \$7.25-\$7.50; hot-rolled and forged bars, \$7.55-\$7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, \$22; H.R. strip, \$19; C.R. strip, \$29; forged or H.R. bars, \$17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel Monel	Inconel
Sheets, C.R.	102	83
Strip, C.R.	102	92
Plate, H.R.	97	87
Rod, Shapes, H.R.	87	74
Seamless Tubes	122	110

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round—2011-T3	Round—2017-T4	Hexagonal—2011-T3	Hexagonal—2017-T4
Drawn				
0.125	80.4	87.9	...	...
0.156-0.172	59.0	57.4	...	...
0.188	59.0	57.4	...	73.2
0.219-0.234	56.0	54.4	...	...
0.250-0.281	56.0	54.4	...	69.9
0.313	56.0	54.4	...	64.7
Cold-finished				
0.375-0.547	54.9	52.9	65.2	62.8
0.563-0.688	54.9	52.9	62.1	59.0
0.750-1.000	53.6	51.6	56.9	55.7
1.963	53.6	51.6	...	53.8
1.125-1.500	51.6	49.7	55.1	53.8
Ended				
1.563	50.3	48.4	...	...
1.825-2.090	49.7	47.7	...	52.0
2.125-2.500	48.5	46.5	...	...
2.563-3.375	47.1	45.1	...	...

BRASS MILL PRICES

	MILL PRODUCTS a			SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy Ends	Rod Clean Turnings
Copper	61.63b	58.86c	...	61.82	36.000	33.250
Yellow Brass	52.10	42.65d	52.84	55.01	27.250	27.000
Low Brass, 80%	55.85	55.79	54.39	54.66	30.625	30.375
Red Brass, 85%	57.19	57.13	57.73	60.00	31.875	31.625
Common Bronze, 90%	58.08	59.02	59.62	61.64	33.125	32.875
Manganese Bronze	59.46	63.80	...	...	25.250	25.000
Muntz Bronze	53.84	49.65	...	...	25.625	25.375
Naval Brass	55.72	60.63	62.78	58.88	25.250	25.000
Naval Bronze	55.22	64.41	65.26	67.26e	33.000	34.750
Nickel Silver, 10%	67.76	70.09g	70.09	...	32.750	32.500
Phos. Bronze, A, 5%	79.58	80.06	80.05	81.26	34.250	34.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

ALUMINUM (Continued)
Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles*
0.249-0.136	39.0	43.8	...	...
0.135-0.096	39.5	44.7	37.5	42.4
0.095-0.077	40.2	45.7	37.6	42.8
0.076-0.061	40.8	46.6	37.8	43.0
0.060-0.048	41.4	47.1	38.2	43.8
0.047-0.038	41.9	48.0	38.7	43.9
0.037-0.030	42.3	48.5	39.1	44.6
0.029-0.024	42.9	49.0	39.4	45.1
0.023-0.019	43.7	50.5	40.3	46.0
0.018-0.017	44.5	...	40.9	46.9
0.016-0.015	45.4	...	41.7	48.1
0.014	46.4	...	42.7	49.4
0.013-0.012	47.6	...	43.4	50.4
0.011	48.6	...	44.6	52.0
0.010-0.0095	49.9	...	45.8	53.7
0.009-0.0085	51.2	...	47.3	55.8
0.008-0.0075	52.8	...	48.5	57.6
0.007	54.3	...	50.0	59.9
0.006	55.9	...	51.4	64.9

*48 in. max diam. 126 in. max diam. Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circles Base
1100-F, 3003-F	25.0	42.3
5050-F	39.1	43.4
3004-F	40.1	45.3
5052-F	41.4	46.7
6061-T8	42.6	47.5
2024-T4*	45.1	51.4
7075-T8*	52.9	60.0

*24-48 in. widths or diam, 72-150 lengths.

Forging Stock: Round, Class 1, 40.60-51.60 in specific lengths 36-144 in. diameters 0.375-8 in. Rectangles and squares, Class 1, 44.50-57.70 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T8, 30-ft length, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)	Nom. Pipe Size (in.)	Nom. Pipe Size (in.)
1	2	4
1 1/2	3	6
2	4	8

Extruded Solid Shapes:

Factor	Alloy 6063-T8	Alloy 6061-T8	Alloy 6062-T8
9-11	43.50-45.00	58.80-62.90	58.30-62.40
12-14	43.80-45.20	59.50-63.80	59.00-63.30
15-17	44.00-45.70	60.70-65.40	60.20-64.90
18-20	44.50-46.20	62.60-67.80	62.10-67.30

MAGNESIUM

Sheet and Plate: AZ31A standard grade, .032 in., 100.00; .040 in., 75.00; .125 in., 68.00; 188 in., 66.50; 250-2.0 in., 65.60. AZ31A special grade, .032 in., 163.10; .080 in., 103.50; 250-2.0 in., 88.90. Trend plate, .188 in., 68.90; 79.20.

Extruded Solid Shapes:

Factor	Com. Grade (P8)	Spec. Grade (AZ31B)
6-8	66.40-69.00	81.40-84.00
12-14	67.50-69.60	82.50-84.60
24-26	72.10-72.70	87.10-87.70
36-38	84.90-85.80	99.90-100.80

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 17.00-18.00; old sheets, 14.00-15.00; borings and turnings, 8.50

9.00; crankcases, 14.00-15.00; industrial castings, 14.00-15.00.

Copper and Brass: No. 1 heavy copper and wire, 30.50-31.00; No. 2 heavy copper and wire, 29.00-29.50; light copper, 28.50-27.00; No. 1 composition red brass, 24.00-24.50; No. 1 composition turnings, 23.50-24.00; yellow brass turnings, 14.00-14.50; new brass clippings, 22.50-23.00; light brass, 14.00-14.50; heavy yellow brass, 16.00-16.50; new brass rod ends, 20.50-21.00; auto radiators, unswasted, 18.00-18.50; cocks and faucets, 19.00-19.50; brass pipe, 19.50-20.00.

Lead: Heavy, 12.00-12.25; battery plates, 7.00; linotype and stereotype, 13.50-14.00; electrolyte, 12.75-13.00; mixed babbit, 14.50.

Metal: Clippings, 55.00-55.00; old sheets, 55.00-55.00; turnings, 60.00-70.00; rods, 55.00-55.00.

Nickel: Sheets and clips, 90.00-190.00; rolled anodes, 90.00-190.00; turnings, 80.00-150.00; rod ends, 90.00-190.00.

Zinc: Old zinc, 5.90-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 19.50-20.00; 3003 clippings, 19.50-19.75; 6151 clippings, 19.50-19.75; 5052 clippings, 19.50-19.75; 2014 clippings, 19.50-19.25; 2017 clippings, 18.50-19.25; 2024 clippings, 18.50-19.25; mixed clippings, 18.25-18.50; old sheets, 16.75-17.00; old cast, 16.75-17.00; clean old cable (free of steel), 18.50-19.50; borings and turnings, 16.25-18.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 34.00; No. 2 heavy copper and wire, 31.50; light copper, 28.25; No. 1 composition borings, 28.00; No. 1 composition solids, 28.50; heavy yellow brass solids, 19.50; yellow brass turnings, 18.00; radiators, 22.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 34.00; No. 2 heavy copper and wire, 31.50; light copper, 28.25; No. 1 composition borings, 28.00; No. 1 composition solids, 28.50; heavy yellow brass solids, 19.50; yellow brass turnings, 18.00; radiators, 22.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, \$1.70 per lb.

Copper: Flat-rolled, 58.25; oval 57.54, 5000-10,000 lb; electrodeposited, 50.25; 2900-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, \$1.015; 100-499 lb, 99.50; 500-4999 lb, 96.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. Prices eastern delivery.

Tin: Bar or slab, less than 200 lb, \$1.175; 200-499 lb, \$1.160; 500-999 lb, \$1.155; 1000 lb or more, \$1.150.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: \$2.15 per lb. in 100-lb drums. **Chromic Acid:** Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5000 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 44.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.5; 10,000 lb and over, 38.50; prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 30.35; 5000-35,000 lb, 31.25; 36,000 lb, 30.35; prices eastern delivery.

Medium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Medium Stannate: Less than 100 lb, 70.50; 100-600 lb, 62.50; 700-1900 lb, 60.00; 2000-9900 lb, 58.30; 10,000 lb or more, 57.10.

Stannous Chloride (anhydrous): Less than 25 lb, \$1.677; 25 lb, \$1.327; 100 lb, \$1.177; 400 lb, \$1.153; 5290-19,600 lb, \$1.031; 20,000 lb, 99.90.

Stannous Sulphate: Less than 50 lb, \$1.304; 50 lb, \$1.064; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

PLANT CONSTRUCTION

Openings For:—

JUNIOR & SENIOR ENGINEERS

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Box 445, STEEL

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LUBRICATION ENGINEER

Southern California concern operating a large variety of heavy machinery and mobile equipment has technical staff position open for qualified man with mechanical or chemical engineering degree, or equivalent. Must be able to prescribe correct lubricants and lubricating methods, write specifications and schedules, oversee lubricating costs and standards in wide range of usage. State experience, age, training, etc.

WRITE BOX 442, STEEL

Penton Bldg. Cleveland 13, Ohio

ENGINEER WANTED

ENGINEERS, DESIGNERS AND CHECKERS WHO ARE QUALIFIED PERSONNEL WITH EXPERIENCE IN DESIGNING AND BUILDING HEAVY MACHINERY OFFICES LOCATED IN MID-WEST. EXCELLENT OPPORTUNITIES DUE TO BACKLOG OF ORDERS.

REPLY BOX 447, STEEL

FENTON BLDG., CLEVELAND 13, OHIO

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SALARIED POSITIONS \$5,000 to \$35,000. We offer the original personal employment service (established 46 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. E. W. BIXBY, INC., 646 Brisbane Bldg., Buffalo 3, N. Y.

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, 50 words or less \$15.00, each additional word .30; all capitals, 80 words or less \$19.20, each additional word .38; all capitals leaded, 80 words or less \$23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less \$3.60, each additional word .14; all capitals, 25 words or less \$4.50, each additional word .18; all capitals leaded, 25 words or less \$5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

AVAILABLE FOR IMMEDIATE DELIVERY

1—35-40 ton Model 8 Industrial Brown-boist Diesel Locomotive Crane, Serial #11401, with 50' boom, powered with Caterpillar D13000 diesel engine. Cap. 70,000 # @ 12' radius; 84,000 # @ 12' radius with outriggers. Thoroughly rebuilt. Will pass the most rigid inspection. Your inspection invited. Located at our Clifton Heights, Pa. plant.

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Advertising Index

Abell-Hawn Co.	154
Ajax Engineering Corporation	117
Alan Wood Steel Co.	150
Allegheny Ludlum Steel Corporation	36
Allen Manufacturing Co.	29
Allied Research Products, Inc.	62
Allis, Louis, Co., The	69
Alloy Steel Casting Co.	169
American Broach & Machine Co., A Division of Sundstrand Machine Tool Co.	28
American Cast Iron Pipe Co.	22
American Chain & Cable	158
American Machine & Foundry Co., Cleveland Welding Division	51
American Smelting & Refining Co., Federated Metals Division	148
American Steel & Wire Division, United States Steel Corporation	58, 59
Anaconda Wire & Cable Co.	127
Arco Corporation	156, 157
Armco Steel Corporation	74
Armstrong Cork Co.	134
Arwood Precision Casting Corporation	128
Atlas Mineral Products Co.	146
Avondale Marine Ways, Inc.	13
Bakelite Co., A Division of Union Carbide & Carbon Corporation	65
Barnes, W. F. & John, Automation Section	68
Behr-Manning Co., A Division of Norton Co.	23
Bethlehem Steel Co.	1, 182
Bixby, R. W., Inc.	179
Blaw-Knox Co., Foundry & Mill Machinery Division	53
Borg-Warner Corporation, Ingersoll Steel Division	172
Broderick & Boscom Rope Co.	169
Bucyrus-Erie Co.	12
Bullard Co., The	90
Bunting Brass & Bronze Co., The	180
Carborundum Co., The, Refractories Division	57
Carborundum Co., The, Stupakoff Division	86
Carlson, G. O., Inc.	20, 21
Cattle, Joseph P., & Brothers, Inc.	172
Central Foundry Division, General Motors Corporation	45
Century Electric Co.	177
Chicago Concrete Breaking Co.	24
Chicago Steel Service Co.	103
Cincinnati Bickford Division, Giddings & Lewis Machine Tool Co.	43
Cincinnati Shaper Co., The	26, 27
Cities Service Oil Co.	50
Cleveland Welding Division, American Machine & Foundry Co.	51
Cleveland Worm & Gear Co., The	Inside Back Cover
Cold Metal Products Co., The	73
Colorado Fuel & Iron Corporation, The	8, 9, 17
Columbia-Geneva Steel Division, United States Steel Corporation	58, 59
Cone Automatic Machine Co., Inc.	104
Copperweld Steel Co., Steel Division	93
Cowles Tool Co.	173
Crutcher Steel Company of America	147
Cutler-Hammer, Inc.	Back Cover
De Laval Steam Turbine Co.	31
Diamond Manufacturing Co.	96
Daw Chemical Co., The	175
Duralay Co., The	142
Eastern Machine Screw Corporation, The	172
Eastman Kodak Co., X-ray Division	129
Electric Controller & Mfg. Division of Square D Co.	Inside Front Cover
Electric Equipment Co.	179
Electric Service Co.	179

Erie Foundry Co.	46
Eveready Supply Co., The	179
Fairfield Manufacturing Co.	140
Falk Corporation, The	67
Farrar-Birmingham Co., Inc.	149
Foto-Roat-Heath Co., The, Plymouth Locomotive Works Division	19
Federated Metals Division of American Smelting & Refining Co.	148
Fenn Manufacturing Co., The	10
Firth Sterling, Inc.	144
Frasse, Peter A., & Co., Inc.	11

Gardner-Denver Co.	163
Gates Rubber Co., The	64
General Motors Corporation, Central Foundry Division	45
Giddings & Lewis Machine Tool Co., Cincinnati Bickford Division	43
Goodyear Tire & Rubber Co., Inc., The	4
Graphic Systems	96

Hamilton Foundry & Machine Co., The	25
Hansen Manufacturing Co., The	135
Hilyard Co., The	179
Helcraft & Co.	160
Hough, Frank G., Co., The	48, 49
Houghton, E. P., & Co.	42
Hyde Park Foundry & Machine Co.	181

Industrial Brownhoist Corporation	63
Ingersoll Steel Division, Berg-Warner Corporation	172
Ironides Co., The	38, 39

Johns-Manville	34
Johnson Bronze Co.	40
Jones & Laughlin Steel Corporation	139

Kardong Brothers, Inc.	172
Kennametal, Inc.	57
Kling Bros. Engineering Works	3

Lectromelt Furnace Co.	107
Levinson Steel Co., The	133
Londie Machine Co.	7
Linde Air Products Co., A Division of Union Carbide & Carbon Corporation	60
Link-Belt Co.	37

Metal Processing Machine Co., The	85
Micro Switch, A Division of Minneapolis-Honeywell Regulator Co.	143
Minneapolis-Honeywell Regulator Co., Micro Switch Division	143
Morgan Engineering Co., The	44
Marco Twist Drill & Machine Co.	14, 15

National Malleable & Steel Castings Co.	136
National Steel Corporation	47
National Tube Division, United States Steel Corporation	58, 59
Norfolk & Western Railway	120
Norton Co., Behr-Manning Division	23
Norton Co., Machine Division	30

Pennsylvania Salt Manufacturing Co.	18
Peters-Dutton, Inc.	101

Plymouth Locomotive Works, Division of The Foto-Roat-Heath Co.	19
Prostate Corporation	132

Reliance Electric & Engineering Co.	56
Republic Steel Corporation	32, 33
Roobling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation	17
Ryerson, Joseph T., & Son, Inc.	76

Sciaky Bros., Inc.	41
Sealmaster Bearings, A Division of Stephens-Adomson Mfg. Co.	108
Shenango Centrifugal Casting Division, The Shenango Furnace Co.	141
SKF Industries, Inc.	2
Square D Co.	137
Square D Co., Electric Controller & Mfg. Division	Inside Front Cover
Standard Oil Co. (Indiana)	61
Standard Pressed Steel Co., Unbrake Socket Screw Division	122, 133
Standard Stamping & Perforating Co.	172
Standard Tube Co., The	66
Steel Shot Producers, Inc.	145
Stephens-Adomson Mfg. Co., Sealmaster Bearings Division	108
Sterling Grinding Wheel Co.	85
Struthers Wells Corporation, Titusville Fargo Division	153
Stupakoff Division of The Carborundum Co.	86
Sundstrand Machine Tool Co., American Broach & Machine Co. Division	28

Tainer, Roland, Co., Inc.	97
Tennessee Coal & Iron Division, United States Steel Corporation	58, 59
Texas Co., The	70
Thimoney Pulp & Paper Co.	120
Timken Baller Bearing Co., The, Steel & Tube Division	94
Tinsman Products, Inc.	98
Titusville Fargo Division, Struthers Wells Corporation	155
Treadwell Construction Co.	119

Union Carbide & Carbon Corporation, Bakelite Co.	65
Union Carbide & Carbon Corporation, Linde Air Products Co.	60
United Engineering & Foundry Co.	35
United States Rubber Co., Mechanical Goods Division	152
United States Steel Corporation, Subsidiaries	58, 59
United States Steel Export Co.	58, 59
United States Steel Supply Division, United States Steel Corporation	58, 59
Upson-Walton Co., The	5

Weirton Steel Co.	47
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation	8, 9

Youngstown Sheet & Tube Co., The	54
----------------------------------	----



Table of Contents, Page 5

Classified Advertising, Page 179



Gray Iron Castings

Hyde Park Castings up to 80,000 pounds are sound, accurate and physically dependable.

Precision machining is done by skilled craftsmen in our modern machine shop.

Send your blue prints for quotation.

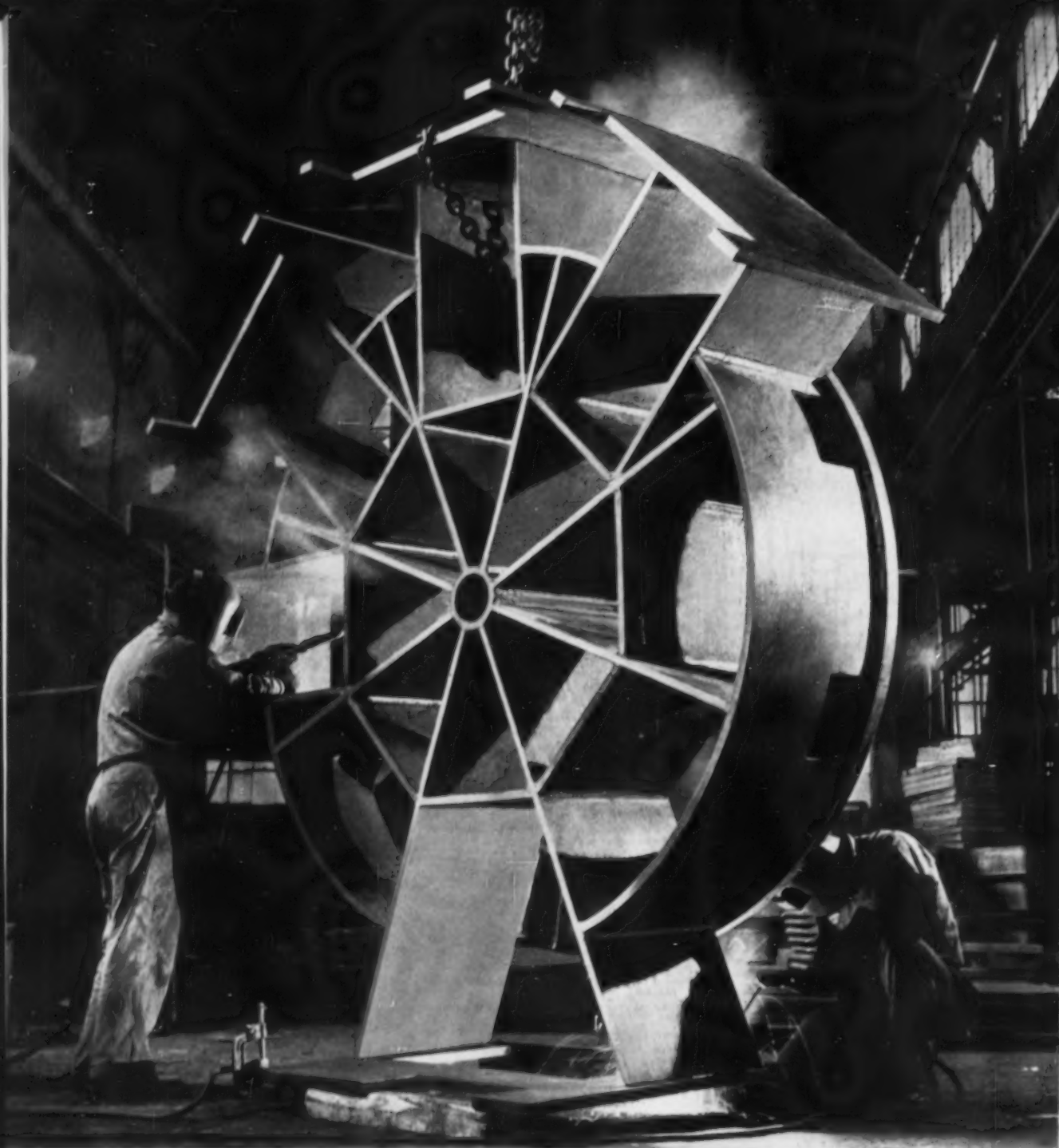


Mill Drive

- Machine Castings
- Lathe Beds
- Housings
- Pinion Housings
- Mill Housings
- Shoe Plates
- Layout Plates
- Surface Plates

For finer finish, long life and greater tonnage, specify Red Circle Rolls.





WELDING STEEL PLATE FOR INDEXING MACHINE BASE — When completed, this special machine base will have a diameter of a little over 10 ft, and will weigh nearly 10 tons. The fabrication is being done in the shop of the McGregor Michigan Corporation, of Detroit. Bethlehem plates were used in 1 in., 1¼ in. and 2 in. thicknesses. The uniform quality of Bethlehem plates makes them ideally suited for fabricating weldments. The use of Bethlehem plates, together with good welding technique, is assurance of sound welds. Bethlehem plates are available in a full range of sheared and universal mill sizes.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast
Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation*





Cleveland-equipped 30-ton traveling hoist in plant of the builder, S. Morgan Smith Co., York, Pa.

30-ton traveling hoist operated by 3 CLEVELANDS

To ensure precision control of the hoisting drums of this traveling hoist, the builder installed a team of Cleveland Worm Gear Speed Reducers. Double reduction of motor speed is effected through an efficient hook-up. Gear shaft of the smaller center unit is extended on each side and connected with the input axles of two larger units which operate the hoisting drums at desired low speeds.

Clevelands fit perfectly into complex power transmission jobs. They're compact—right angle construction of worm gear drive saves space. High shock load resistance and efficient performance are inherent. Parts are reduced to a minimum, reducing maintenance. Torque flow is smooth and uninterrupted. The case-hardened steel worm and nickel-bronze gear actually improve with use.

Wherever you have a power transmission need or problem, simple or complex, find out how a Cleveland speed reducer can handle it dependably and economically. Send for Catalog 400 today. The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited



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Worm Gear

Speed Reducers

Choice of the Leaders

CUTLER-HAMMER

MOTOR CONTROL

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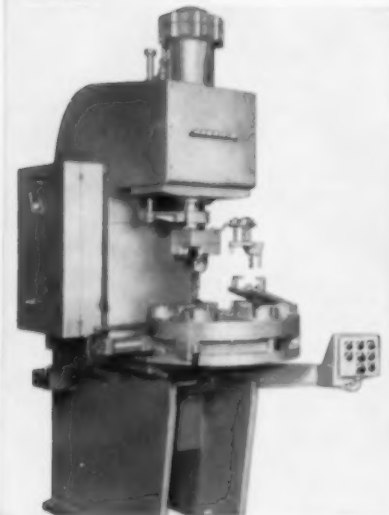
The Mark of Better Machines



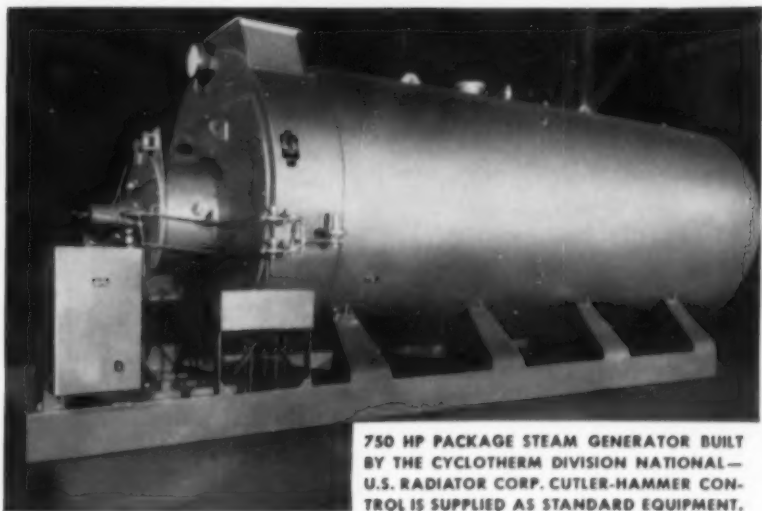
PATTERN MAKERS' LATHE BUILT BY THE IMPERIAL METAL PRODUCTS COMPANY. EQUIPPED WITH CUTLER-HAMMER CONTROL.



NORTON TYPE C-2 ROLL GRINDER BUILT BY THE NORTON COMPANY. EQUIPPED WITH CUTLER-HAMMER THREE STAR MOTOR CONTROL AND HEAVY DUTY OIL-TIGHT PUSHBUTTONS.



25 TON HANNIFIN MODEL F-250 OPEN GAP HYDRAULIC ASSEMBLY PRESS MADE SEMI-AUTOMATIC WITH THE ADDITION OF AN INDEX TABLE. CUTLER-HAMMER THREE STAR CONTROL AND HEAVY DUTY OIL-TIGHT PUSHBUTTONS ARE SUPPLIED AS ORIGINAL EQUIPMENT.



750 HP PACKAGE STEAM GENERATOR BUILT BY THE CYCLOTHERM DIVISION NATIONAL—U.S. RADIATOR CORP. CUTLER-HAMMER CONTROL IS SUPPLIED AS STANDARD EQUIPMENT.

First With The Finest

Leading machinery builders maintain their coveted position by consistently providing their customers with the latest and finest machines known to industry. But this ability to be *first with the finest* doesn't just happen. It demands a comprehensive knowledge of their customer's needs, coupled with an exhaustive program of research, testing and development to produce machinery equal to their customer's needs.

Leading manufacturers of all types of machines will tell you labor-saving machines are in greatest demand,

but to build a dependable automatic machine the control is a dominating factor. The leaders have proven Cutler-Hammer Three Star Motor Control and Heavy Duty Oil-Tight Pushbuttons definitely superior by actual comparison. . . . They install easier, work better, last longer. More than ever before Cutler-Hammer control is the choice of the leaders . . . the mark of better machines. CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis. Associate: Canadian Cutler-Hammer, Ltd., Toronto, Ontario.